The Reproductive System

Part 1: Puberty

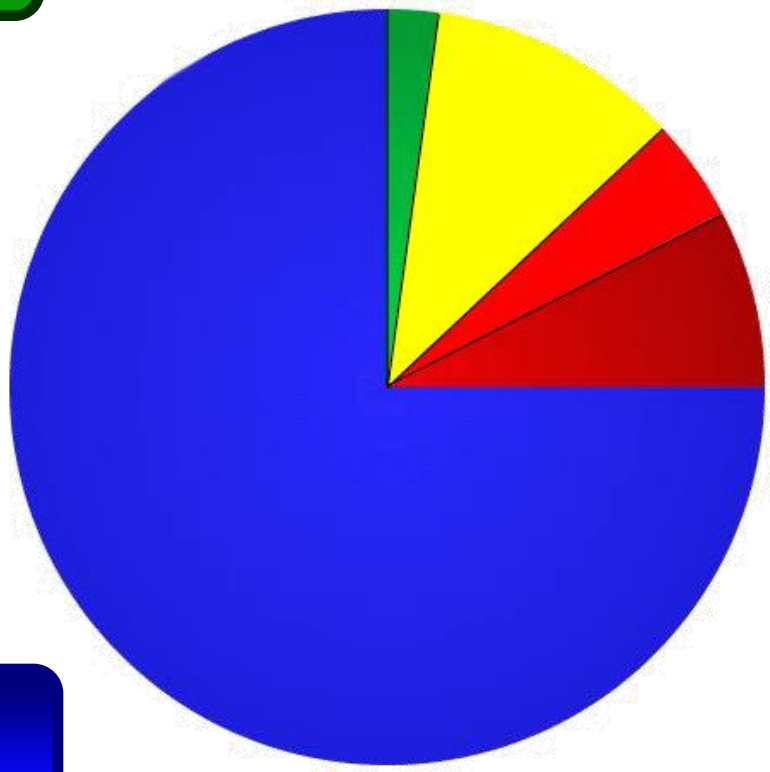
Introduction - Human Life Cycle

Infancy

0-2 yrs

Childhood

2-(12) yrs



Puberty

12-(15) yrs

Adolescence

12-21 yrs [2]

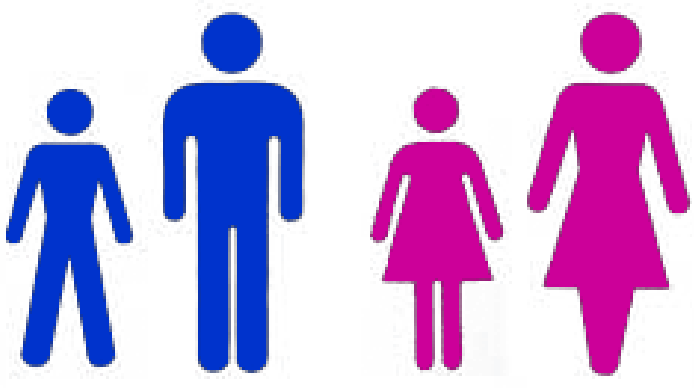
Adulthood

21-? yrs

Adolescence

Adolescence is a time of incredible change.

Adolescence is the stage of human development when children become **adults**, both **physically** AND **mentally**.



The **body** undergoes major **physical** changes.

And the **brain** undergoes major **mental** changes.

Puberty

Adolescence begins with **puberty**.

Puberty is a time of development where the **body** becomes **physically able to reproduce**.

Puberty usually begins around the age of **9-13** in **girls**.

It begins around **10-15** in **boys**.

And usually lasts **3-7** years in both.

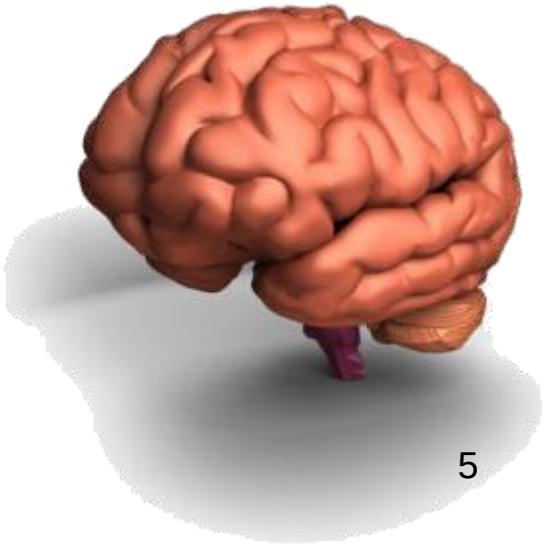
Puberty

Puberty actually begins in the **brain**!

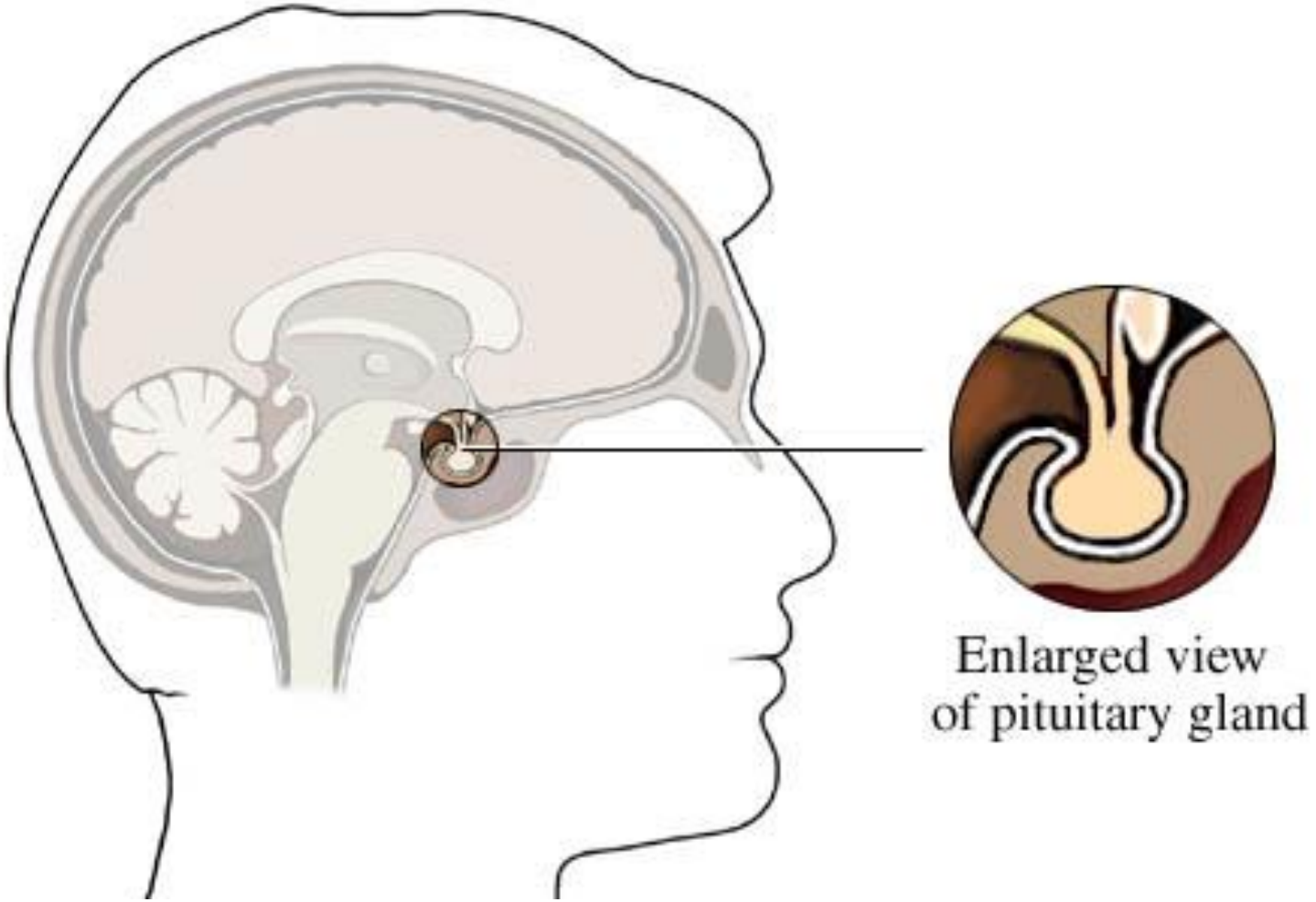
The tiny **pituitary gland** in the brain begins to release chemicals called **hormones**.

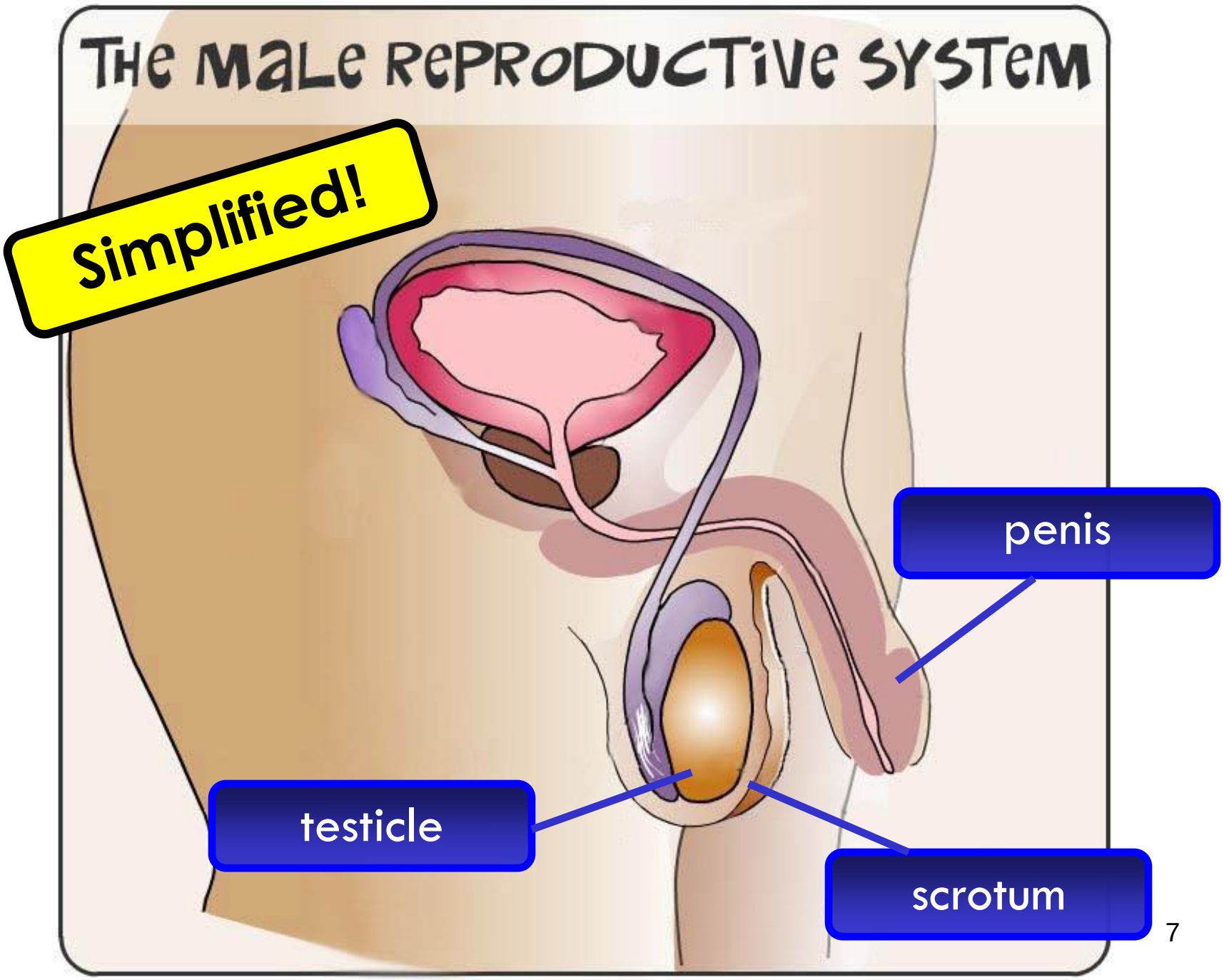
Pituitary hormones called **gonadotrophins** stimulate the sex organs to **mature**.

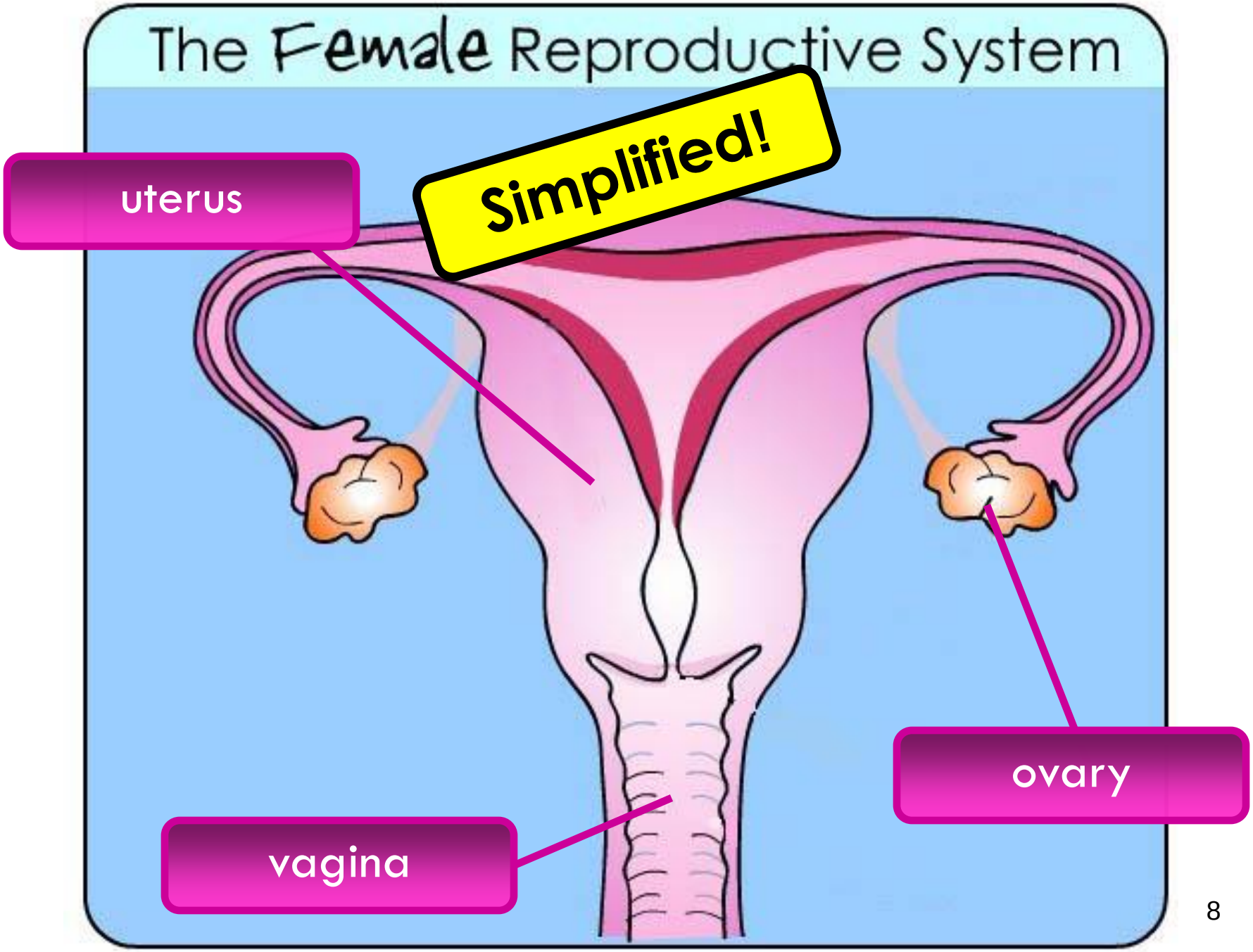
As they mature, the sex organs start to produce their **own hormones**.



Pituitary Gland




THE MALE REPRODUCTIVE SYSTEM
Simplified!
penis
testicle
scrotum


The Female Reproductive System
Simplified!
uterus
ovary
vagina

Primary Changes in Sex Organs

Girls

Ovaries start to produce **egg cells**

And **estrogen**

Boys

Testicles start to produce **sperm cells**

And **testosterone**

Secondary Changes

Testosterone and estrogen then cause the development of **secondary sex characteristics**.

Secondary sex characteristics are physical changes **NOT directly needed to reproduce**.

These changes make the body look more **adult like**.

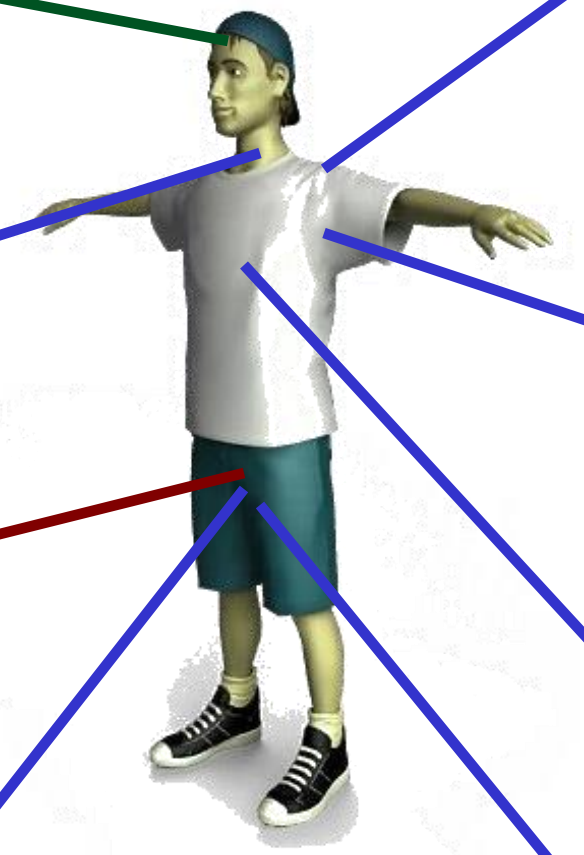
Changes in Boys

Pituitary releases hormones

Voice deepens

Testicles and **sperm cells** develop

Penis and testicles grow



Shoulders widen

Hair grows under arms, on chest, face

Muscles grow and develop

Pubic hair grows

Changes In Girls

Pituitary releases hormones

Ovaries & **egg cells** develop

Vagina grows and develops

Pubic hair grows

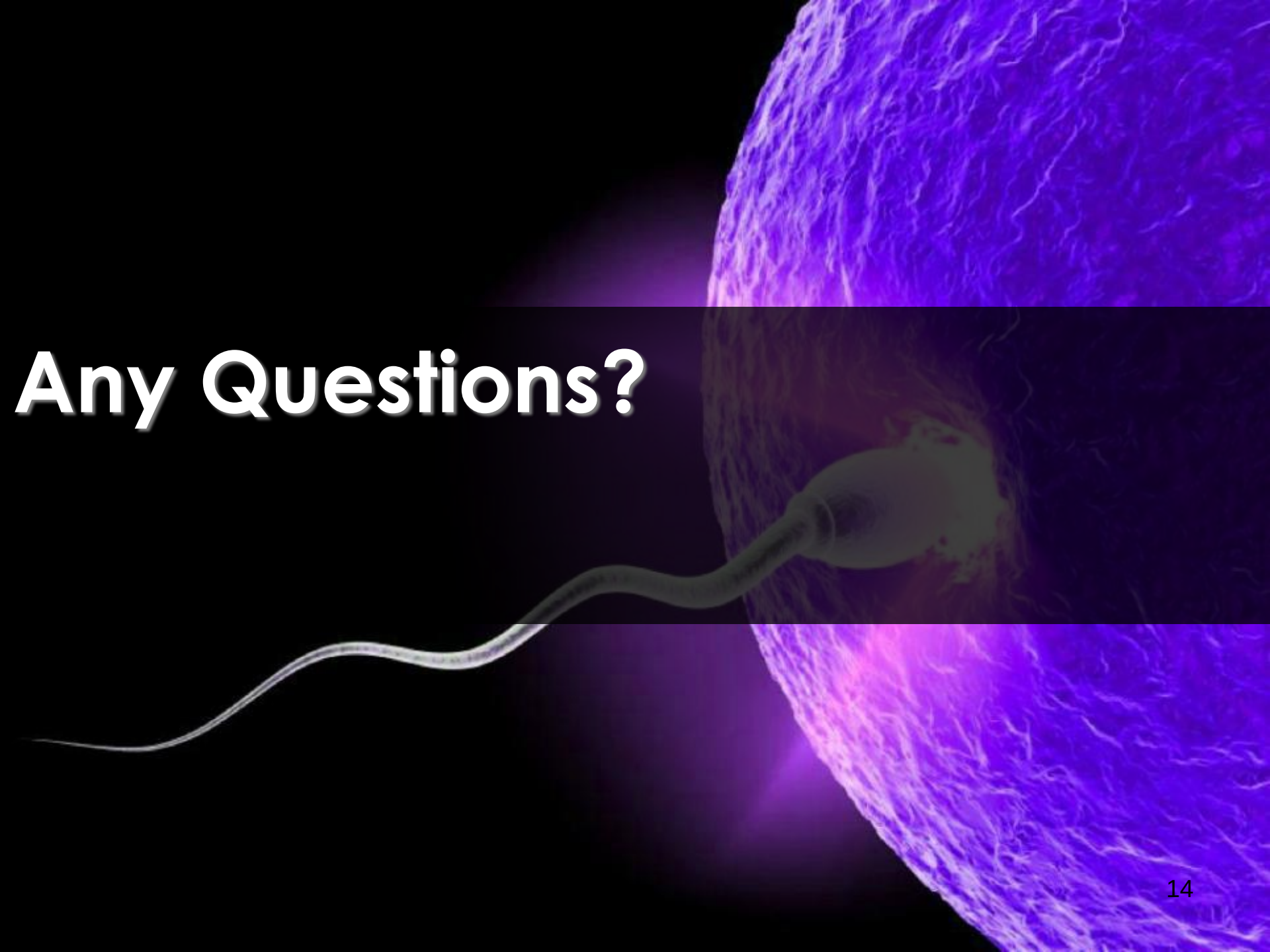
Hair grows under arms and on legs

Breasts grow and develop

Waist narrows & hips widen

Changes in Both Sexes

- Growth spurt
- Perspire more
- Body odor (B.O)
- Oily skin - acne
- Sexual emotions
- Social changes


Any Questions?

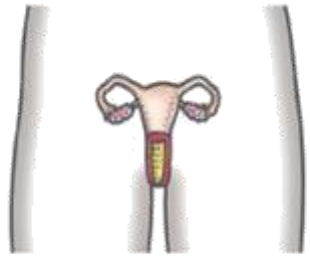
The Reproductive System

Part 2: Reproductive Organs

Introduction

The reproductive system allows adult humans to **produce offspring**.

The main job of the reproductive system is to **create** and to **nourish sex cells**.

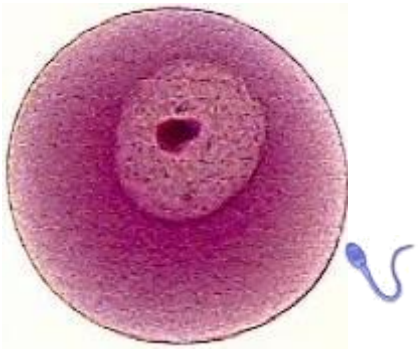


An **egg cell** is the **female** sex cell.

A **sperm cell** is the **male** sex cell.

The Sex Cells

Sperm cells and egg cells are the two sex cells.

Egg (ovum)	Sperm
	
Cannot move on own	A swimming cell
Holds DNA	Holds DNA

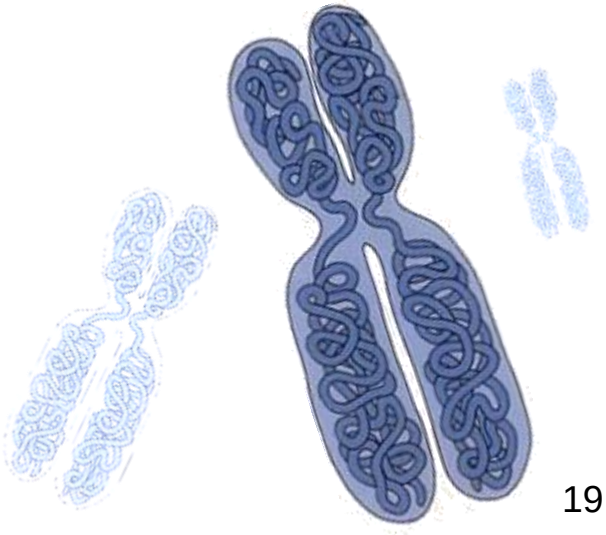
Sperm and Egg

Inside the Sex Cells

Both sperm and egg cells contain **genetic material**.

The genetic material is in the form of DNA, which is packaged in chromosomes.

DNA is the molecule responsible for passing on **inherited traits** such as eye and hair color.



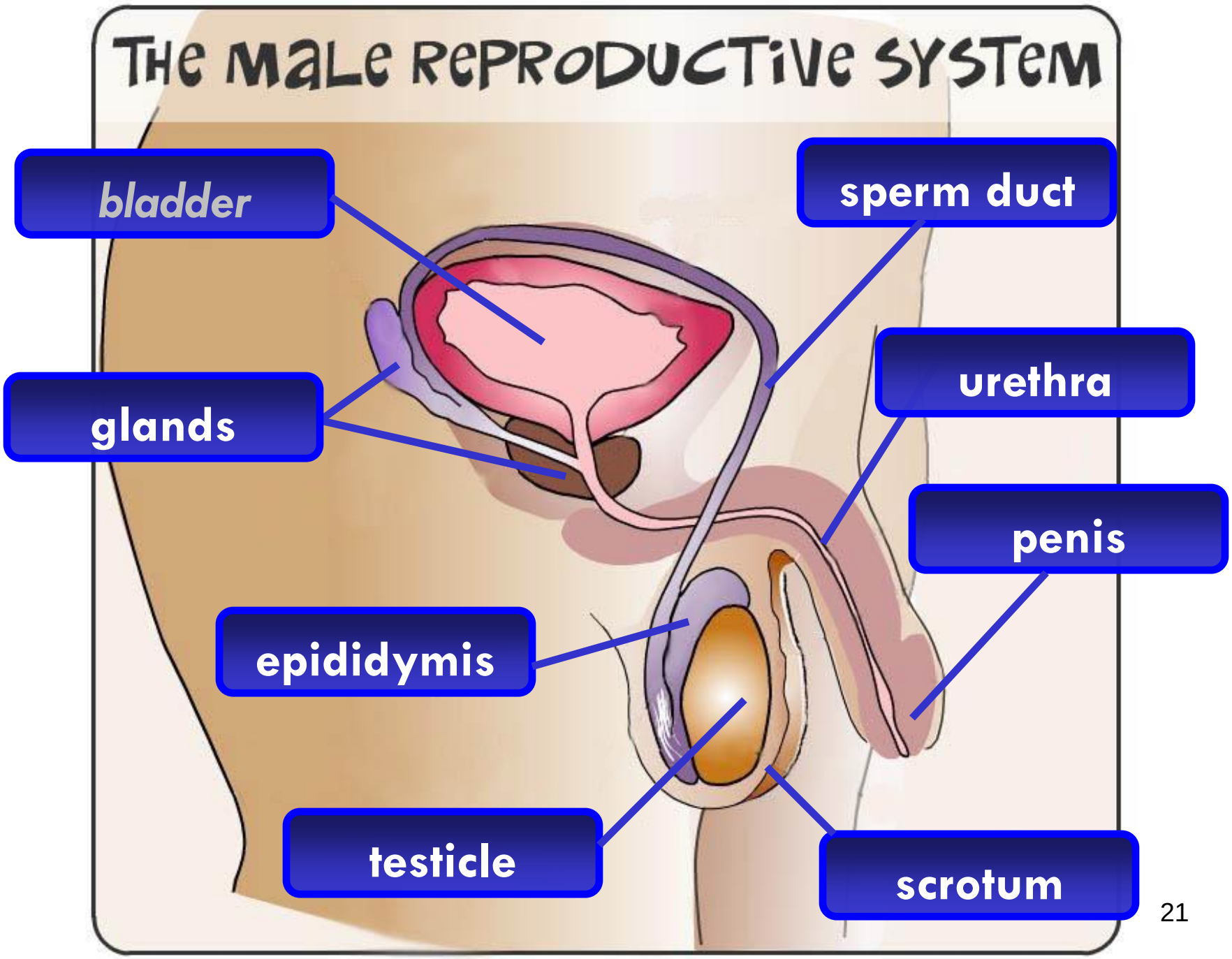
Male Reproductive System

The **primary** reproductive organs are the **testes**.

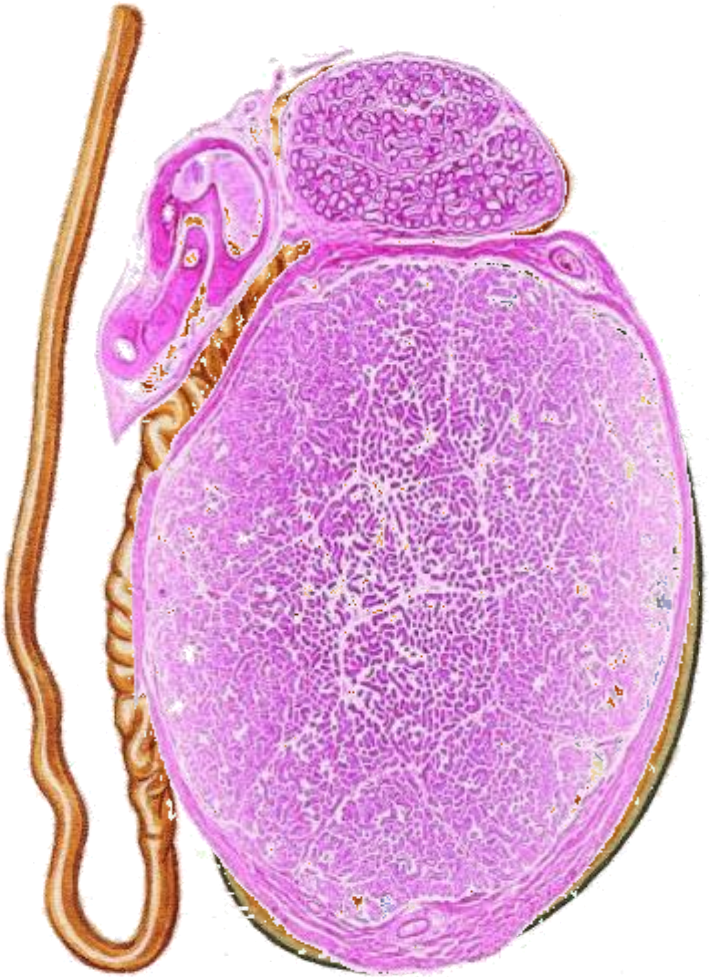
The job of the testes is to produce sperm and the male sex hormone testosterone.

Sperm **can't form** properly at temperatures found **inside** the body.

The testes are found outside the body in a sac called the **scrotum**.


THE MALE REPRODUCTIVE SYSTEM
bladder
sperm duct
glands
urethra
penis
epididymis
testicle
scrotum

Cross Section of a Testicle



Cross Section of a Testicle

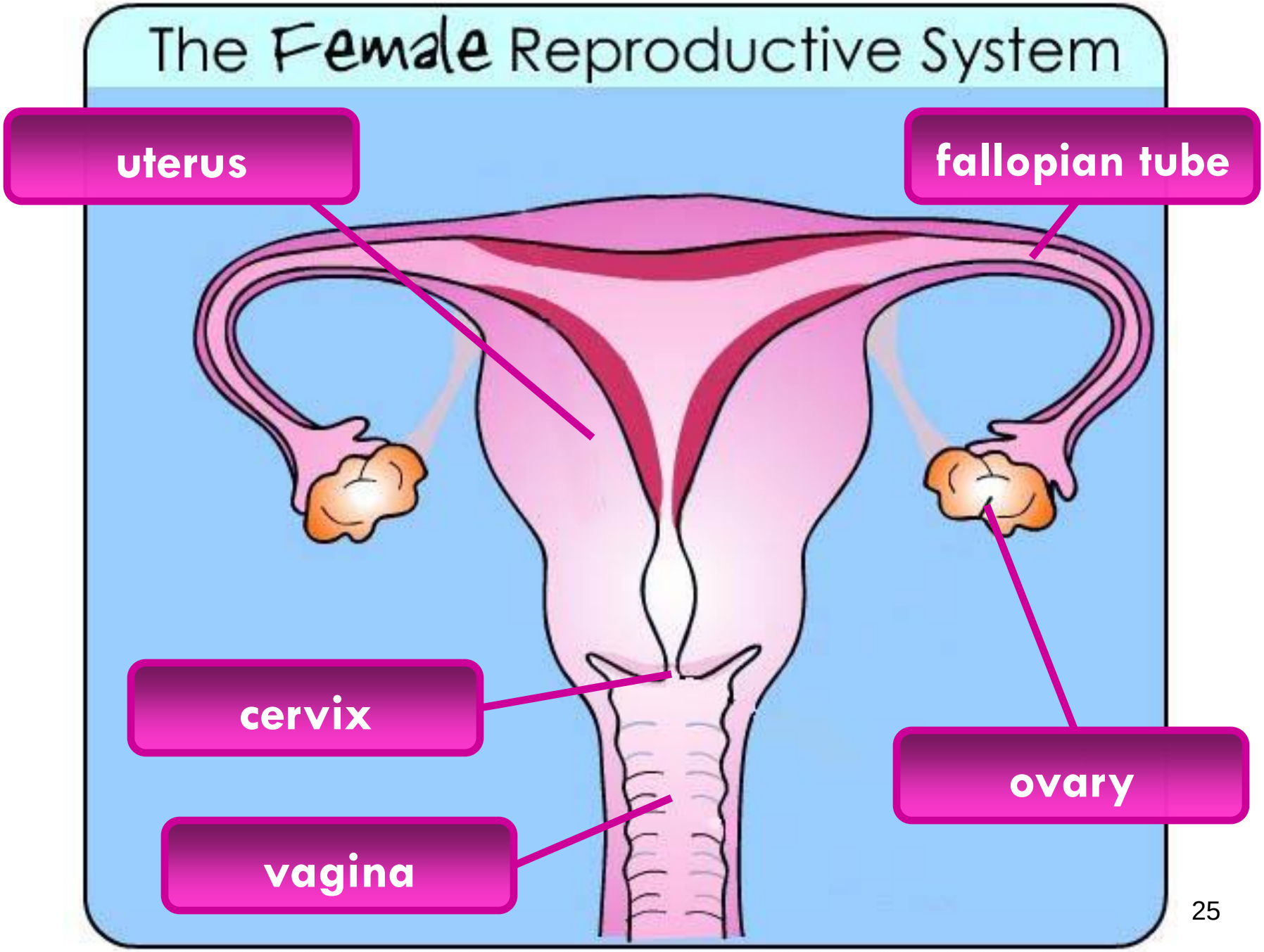
Female Reproductive System

The primary reproductive organs are the **ovaries**.

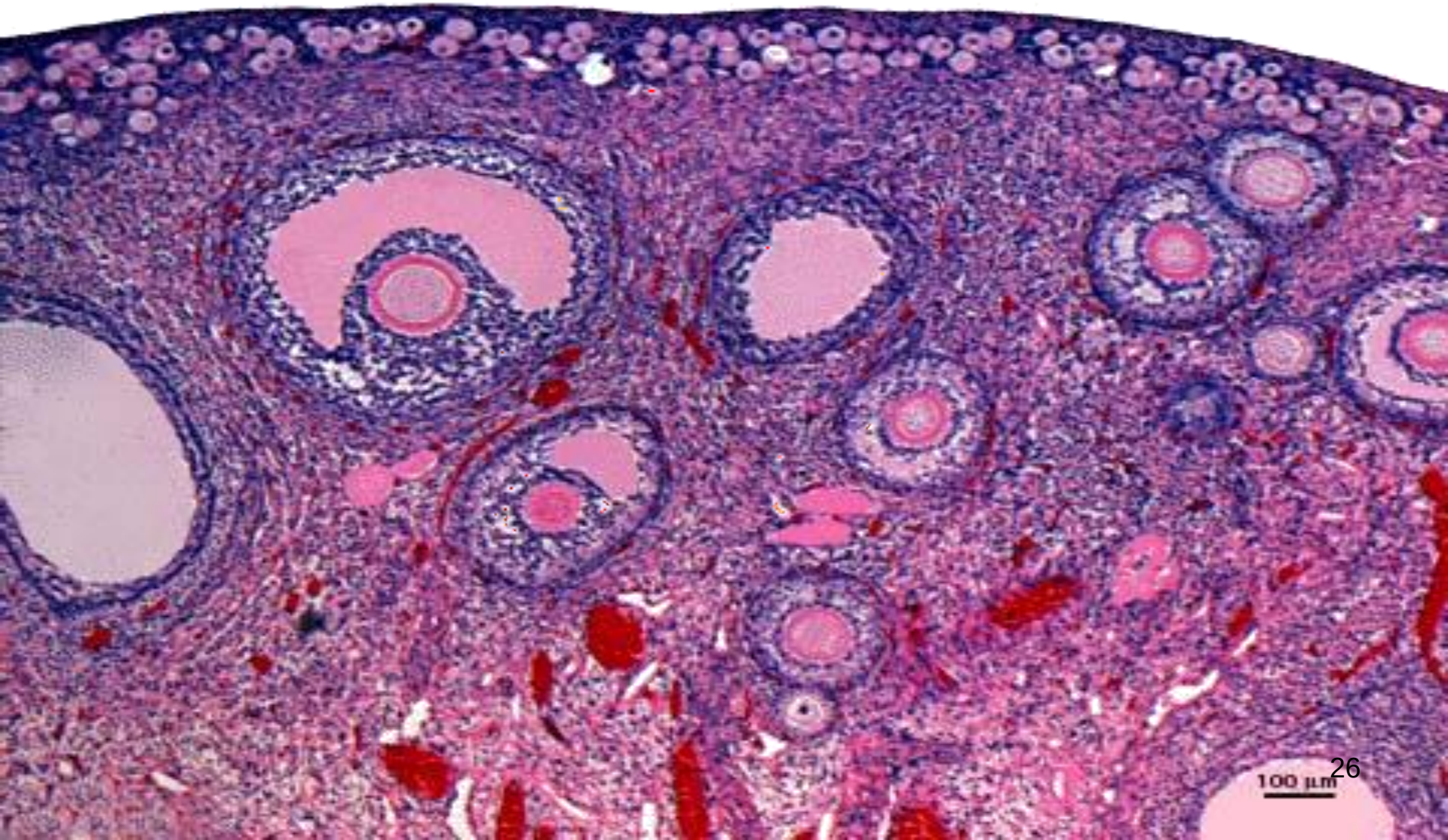
The job of the ovaries is to produce egg cells (ova) and the female sex hormone estrogen.

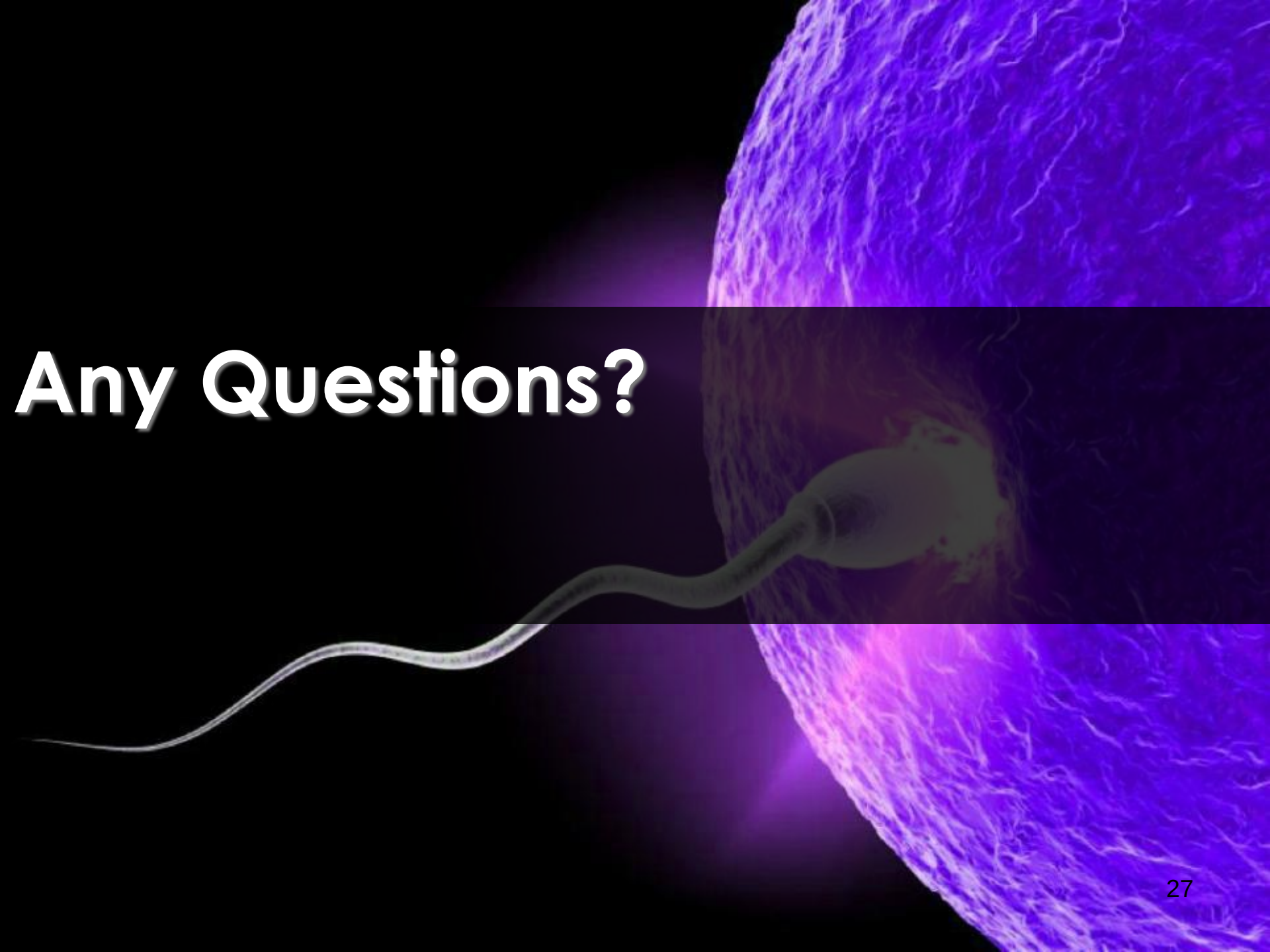
Females are born with all the ova they will ever need… **400,000**!

But, only **500** or so ova fully mature and leave the ovary.


The Female Reproductive System
uterus
fallopian tube
cervix
ovary
vagina

Cross Section of an Ovary




Any Questions?

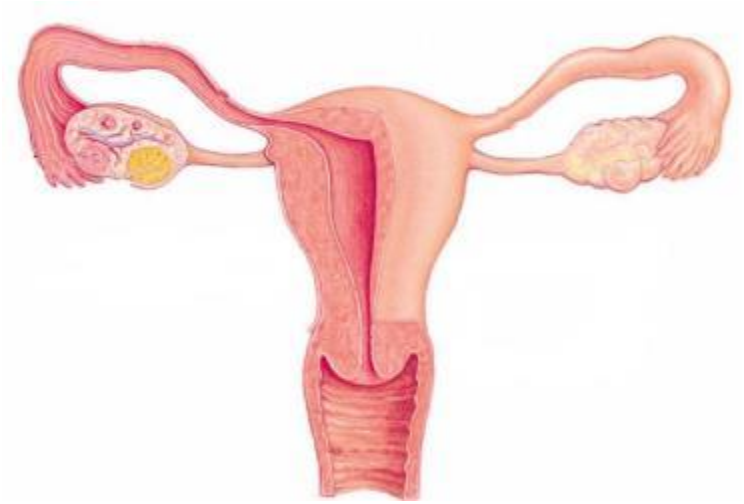
The Reproductive System

Part 3: The Menstrual Cycle

Review

The role of the female reproductive system is to **produce ova** and **nourish offspring** until birth.

The ovaries are the primary sexual organ.

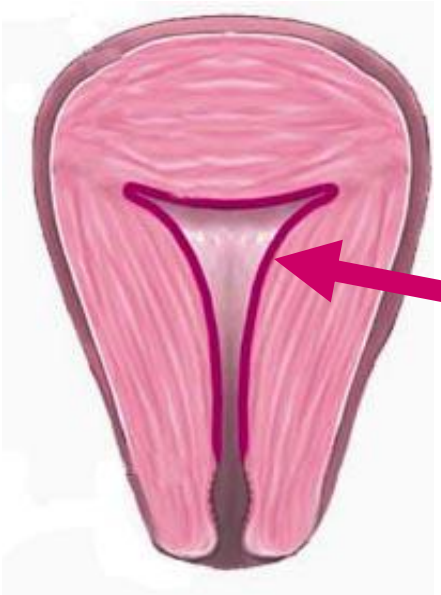


At puberty, a female's ovaries will release **1 egg every 28 days** in a pattern called the **menstrual cycle**.

The Menstrual Cycle

Why is the menstrual cycle necessary?

The goal of the menstrual cycle is to prepare the uterus in case a fertilized egg arrives.



How does it do this?

By thickening its walls (**the endometrium**) with new cells and blood vessels.

The Endometrium

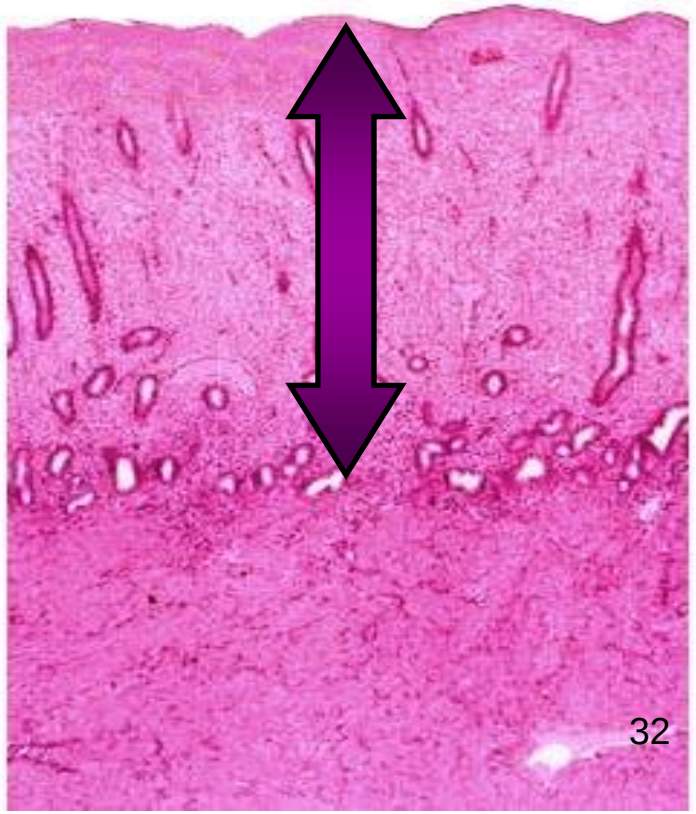
Uterus - Panoramic Cross Section

"Making the Bed"

The uterus lining must become thick with **new cells**.

The **new cells** and **blood vessels** will nourish the growing embryo.

The "bed" must be made **each month** to ensure it is healthy and new.

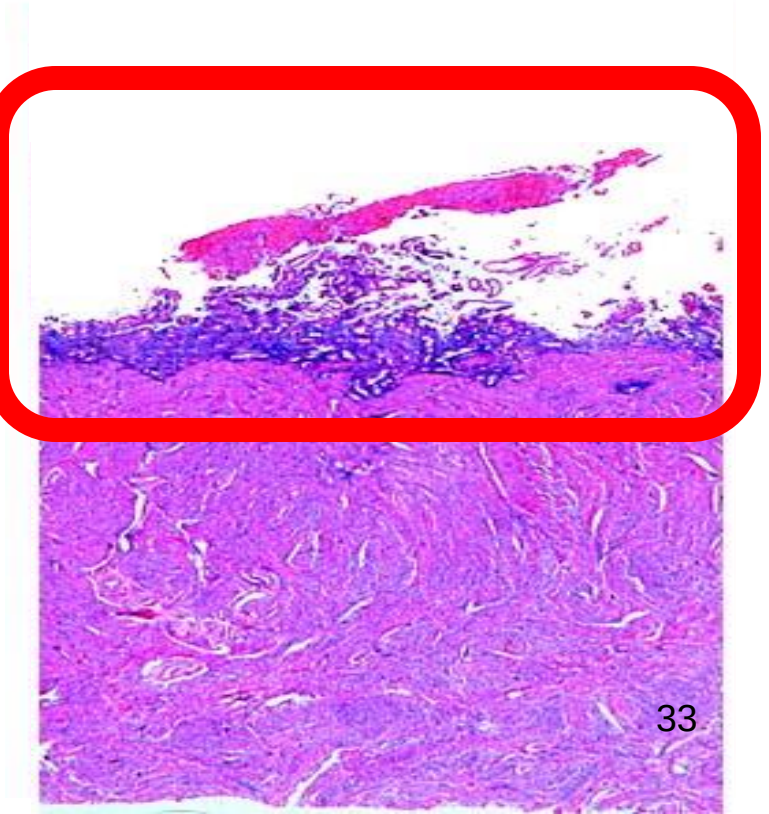


"Making the Bed"

The uterus lining must become thick with **new cells**.

But, if a fertilized egg **does not arrive**, it must be **broken down**.

The excess cells are released from the body during **menstruation**.



The Menstrual Cycle

The menstrual cycle has several **key events**.

The **maturing of an egg** in the ovary.

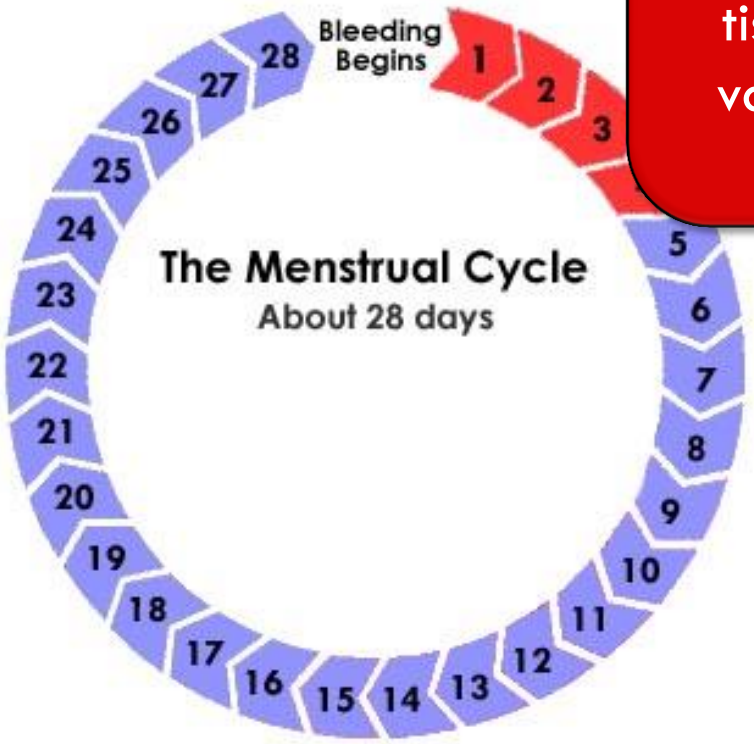
The **release of the egg**.

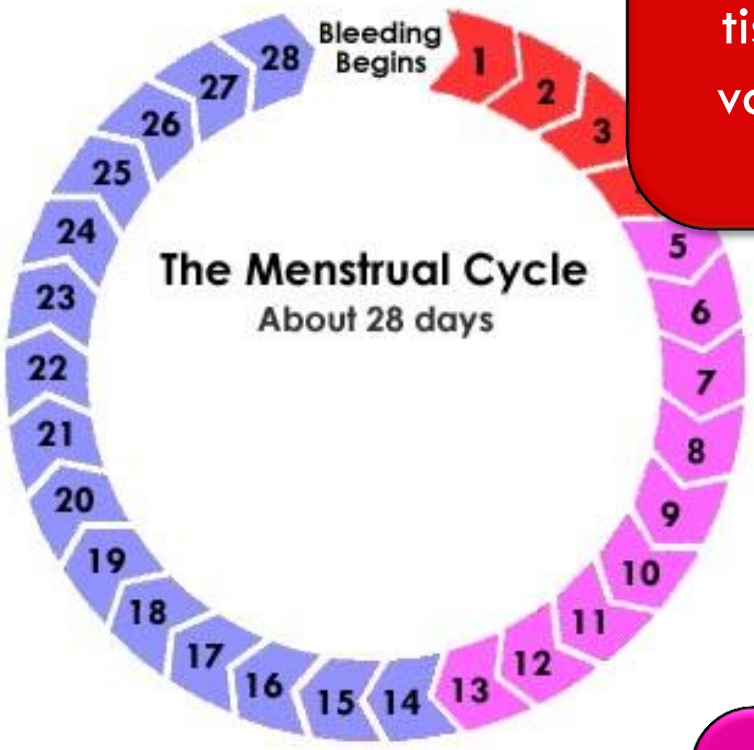
The **build up** of the **uterus** lining.

The **breakdown** of the egg and uterus lining if **no fertilization** has taken place.

DAYS 1 – 6

Uterus lining breaks down. Blood and other tissues flow from the vagina. This is called menstruation.





DAYS 1 – 6

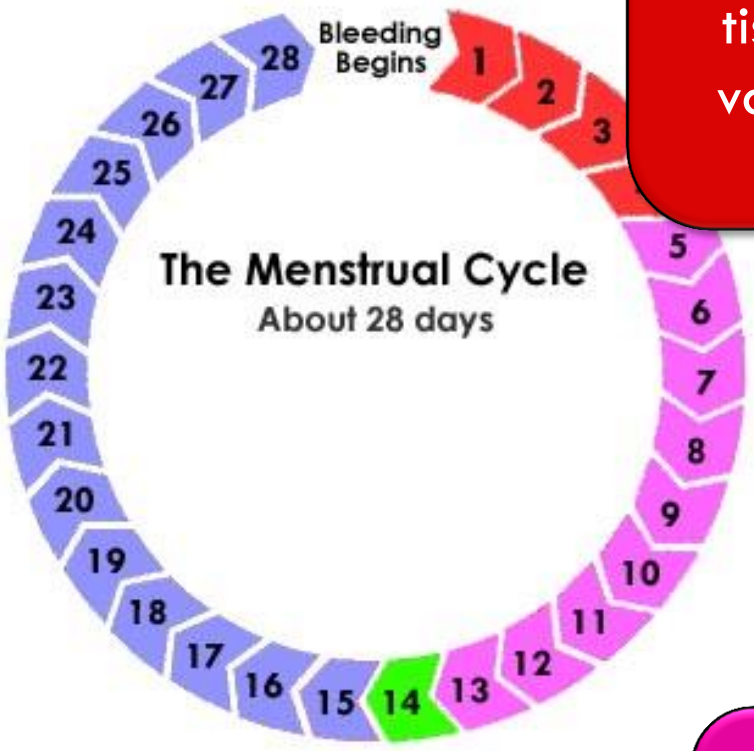
Uterus lining breaks down. Blood and other tissues flow from the vagina. This is called menstruation.

DAYS 6 - 13

Uterus lining builds up in preparation for a fertilized ovum.

DAYS 1 – 6

Uterus lining breaks down. Blood and other tissues flow from the vagina. This is called menstruation.



DAY 14

Egg released by ovary – ovulation.

DAYS 6 - 13

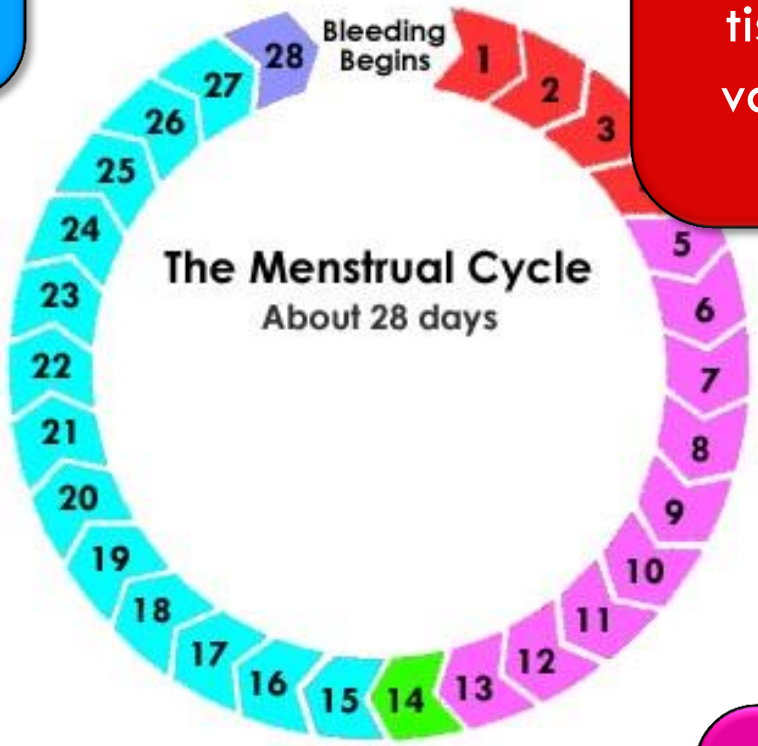
Uterus lining builds up in preparation for a fertilized ovum.

DAYS 15 - 28

Uterus lining remains ready for a fertilized egg.

DAYS 1 – 6

Uterus lining breaks down. Blood and other tissues flow from the vagina. This is called menstruation.



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DAYS 15 - 28

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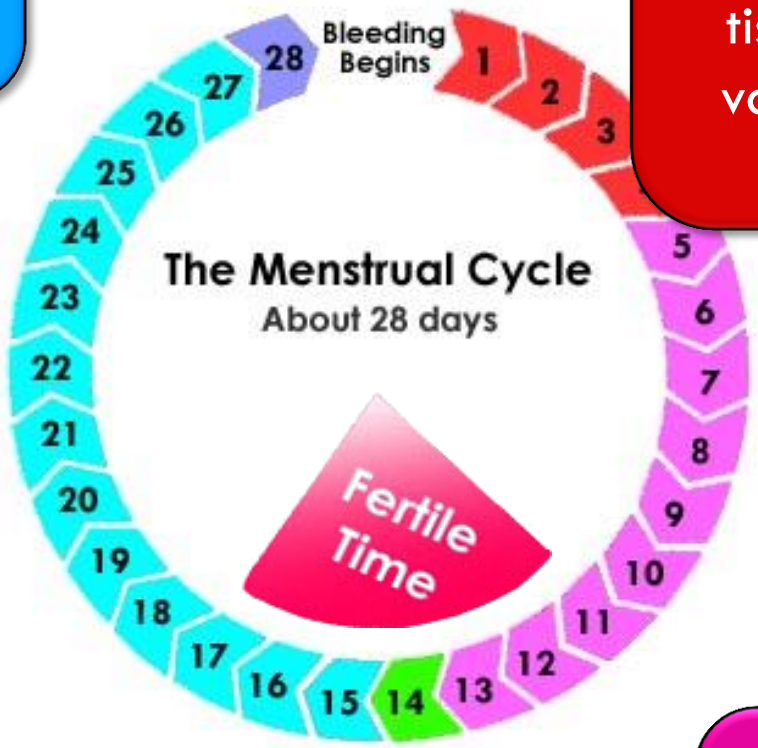


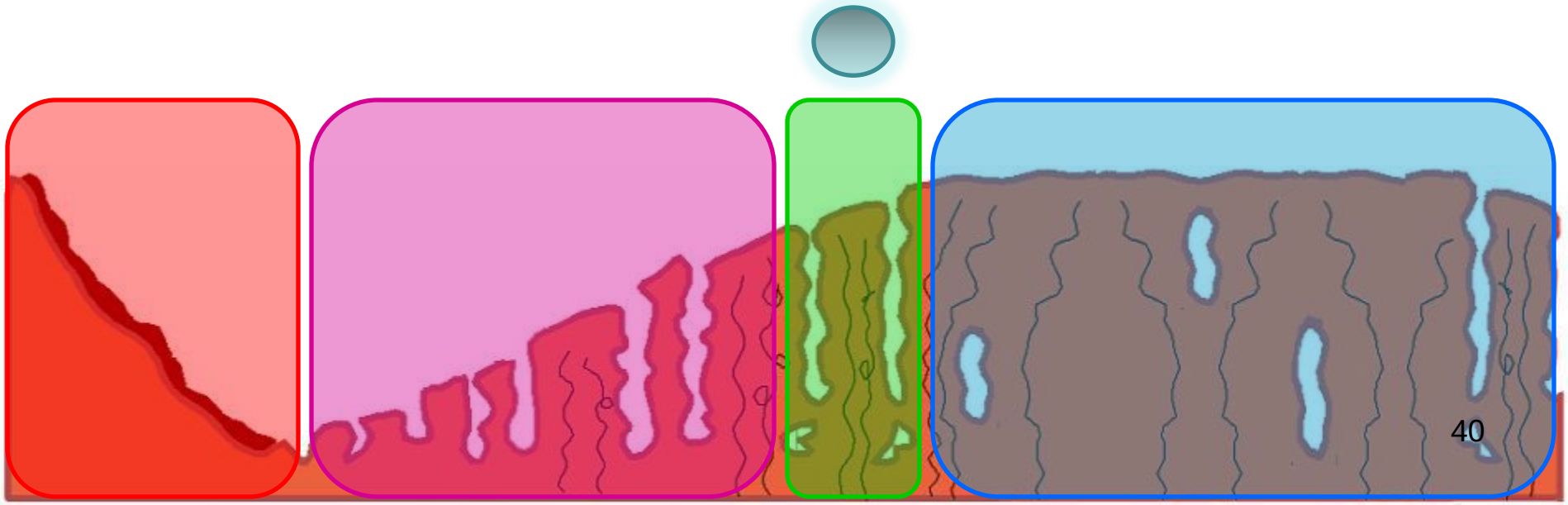
DAY 14

Egg released by ovary – ovulation.

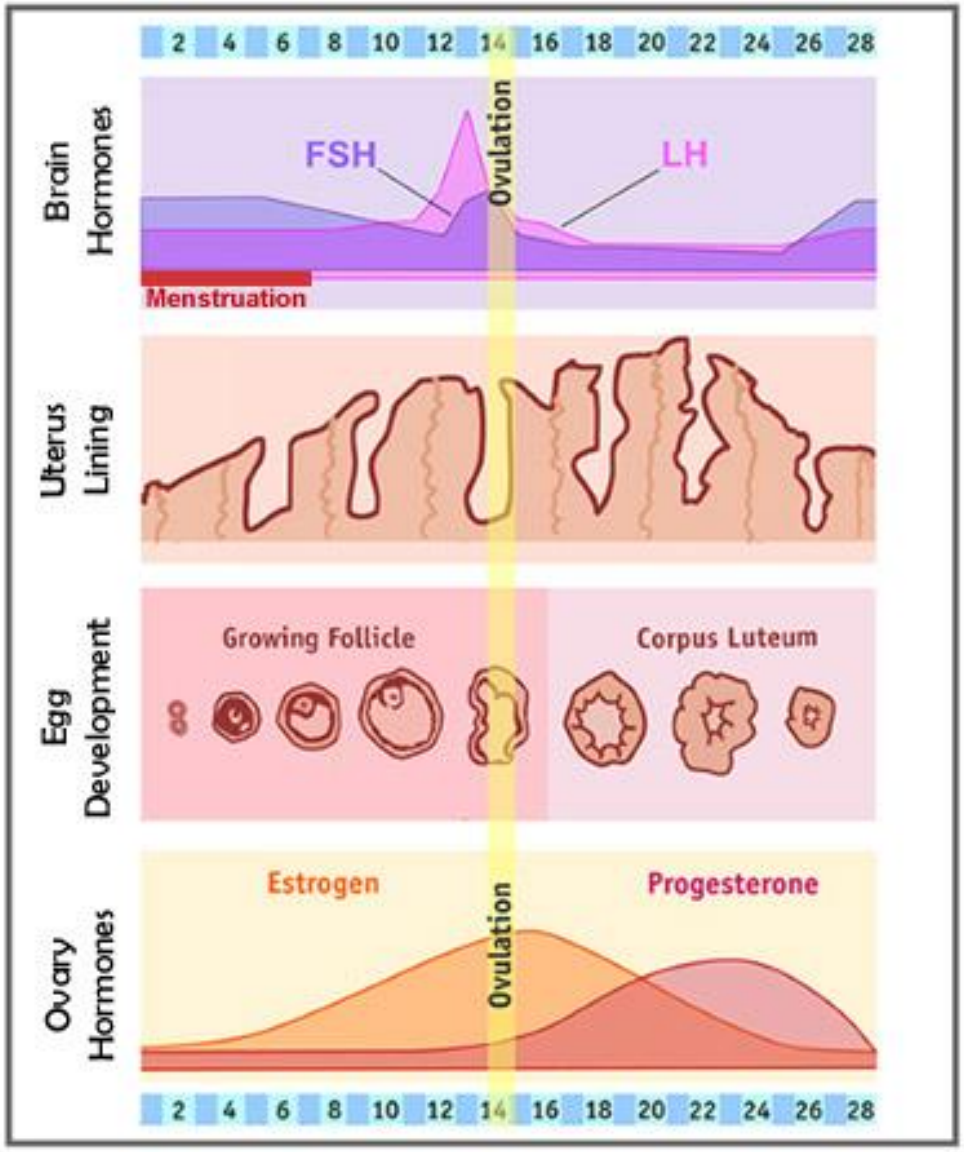
DAYS 6 - 13

Uterus lining builds up in preparation for a fertilized ovum.

Days 1-6	Day 6-13	Day 14	Day 15-28
Lining breaks down during a "period"	Lining builds up again to prepare for ovum	Egg leaves the ovary	Lining stays prepared for fertilized egg. Near day 28, it breaks down



Hormones in the Menstrual Cycle



Menstruation

During a woman's "period" she will release **blood** and **uterus lining cells** through her vagina.

The blood can be absorbed in several ways.

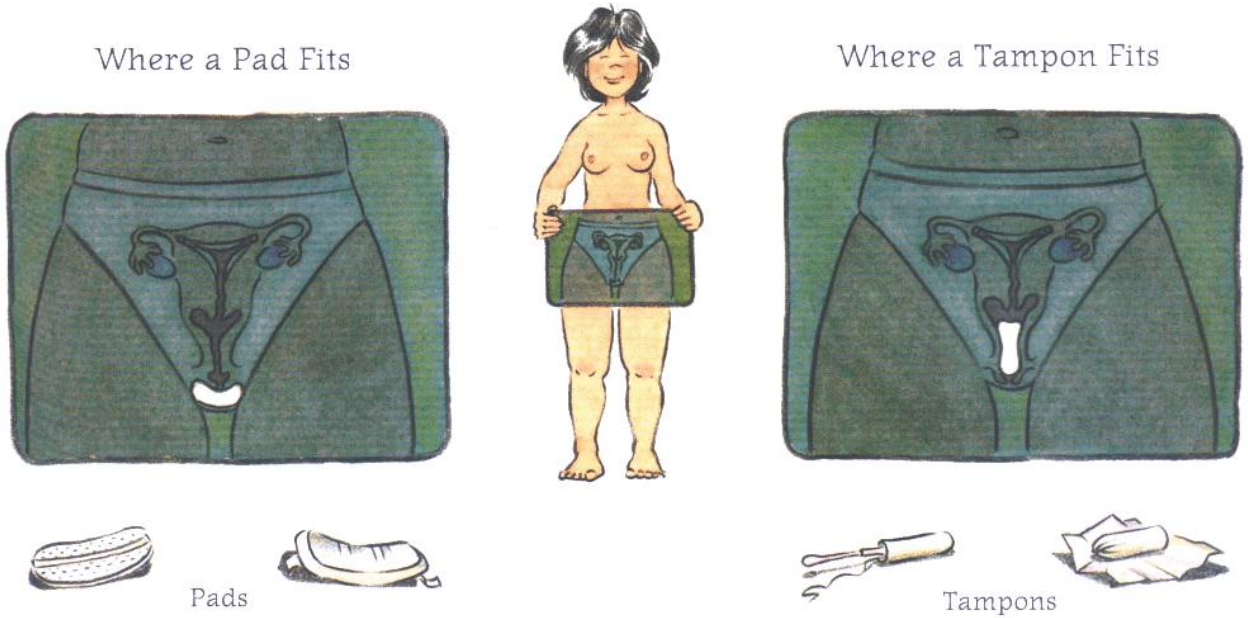
Sanitary pads can be worn inside her underwear.

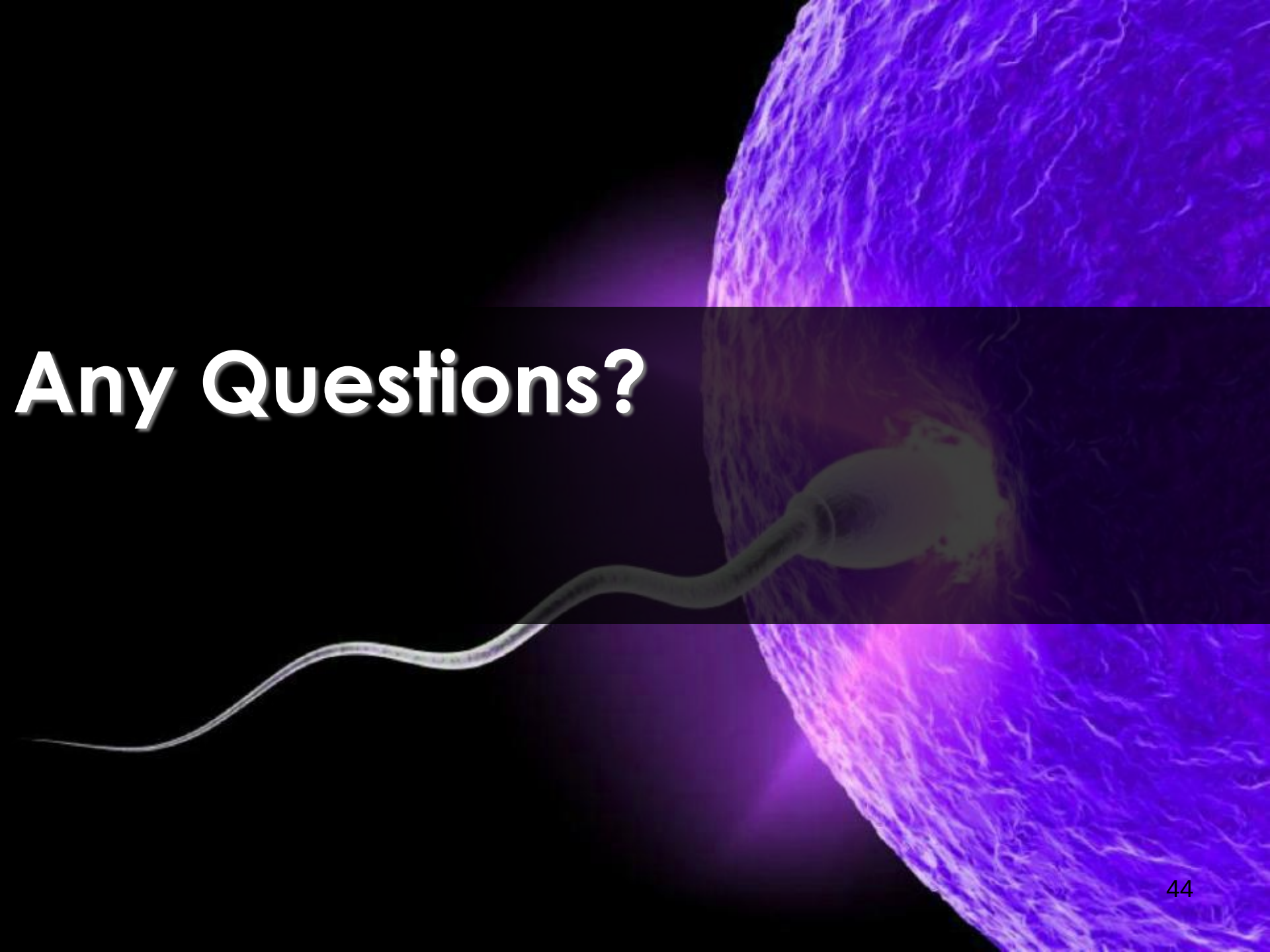
Absorbent **tampons** can be placed inside her vagina.

Menstruation

During a woman's "period" she will release **blood** and **uterus lining cells** through her vagina.

The blood can be absorbed in several ways.




Any Questions?

The Reproductive System

Part 4: Fertilization

Introduction

Reproduction involves the joining of **sperm and egg**.

To do this, humans must engage in **sexual intercourse** to bring sperm to the egg cell.

Before sexual intercourse, two adults will have decided that they are **ready to have a baby** and are able to provide for their child throughout its life.

Before Intercourse

When a man is sexually aroused, changes in his genitals **prepare for sexual intercourse**.

1. The **penis** fills with blood, causing it to increase in size & stiffness, forming an **erection**.

An **erection** is necessary to allow the penis to insert properly into the female's vagina.

2. The **testicles** are pulled towards the man's body to greater protect them.

Before Intercourse

Changes also occur in the female her genitals **prepare for sexual intercourse**.

1. Muscles surrounding the vagina relax.

2. The layers outside the (labia) vagina fill with blood and swell, making the vagina wider.

3. The vagina releases a clear fluid inside to lubricate it in preparation for intercourse.

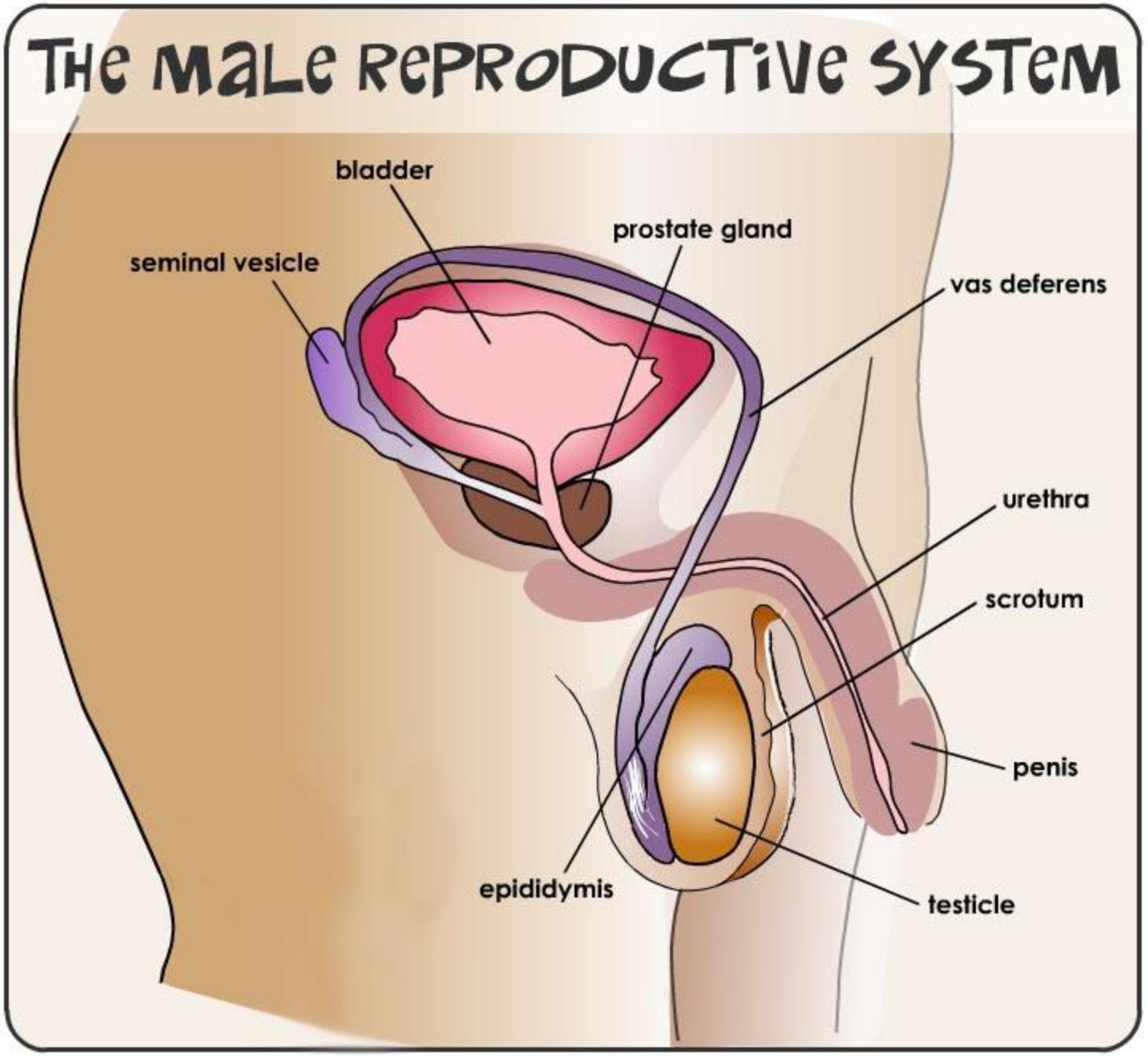
Sexual Intercourse

During sexual intercourse, the male's erect penis enters the female's vagina.

Stimulation during intercourse causes **sperm to be released** from the **epidymis**.

The sperm then mix with fluids from the other **glands** to produce a mixture called **semen**.

Semen exits the penis during an **ejaculation**.


THE MALE REPRODUCTIVE SYSTEM
bladder
prostate gland
seminal vesicle
vas deferens
urethra
scrotum
penis
epididymis
testicle

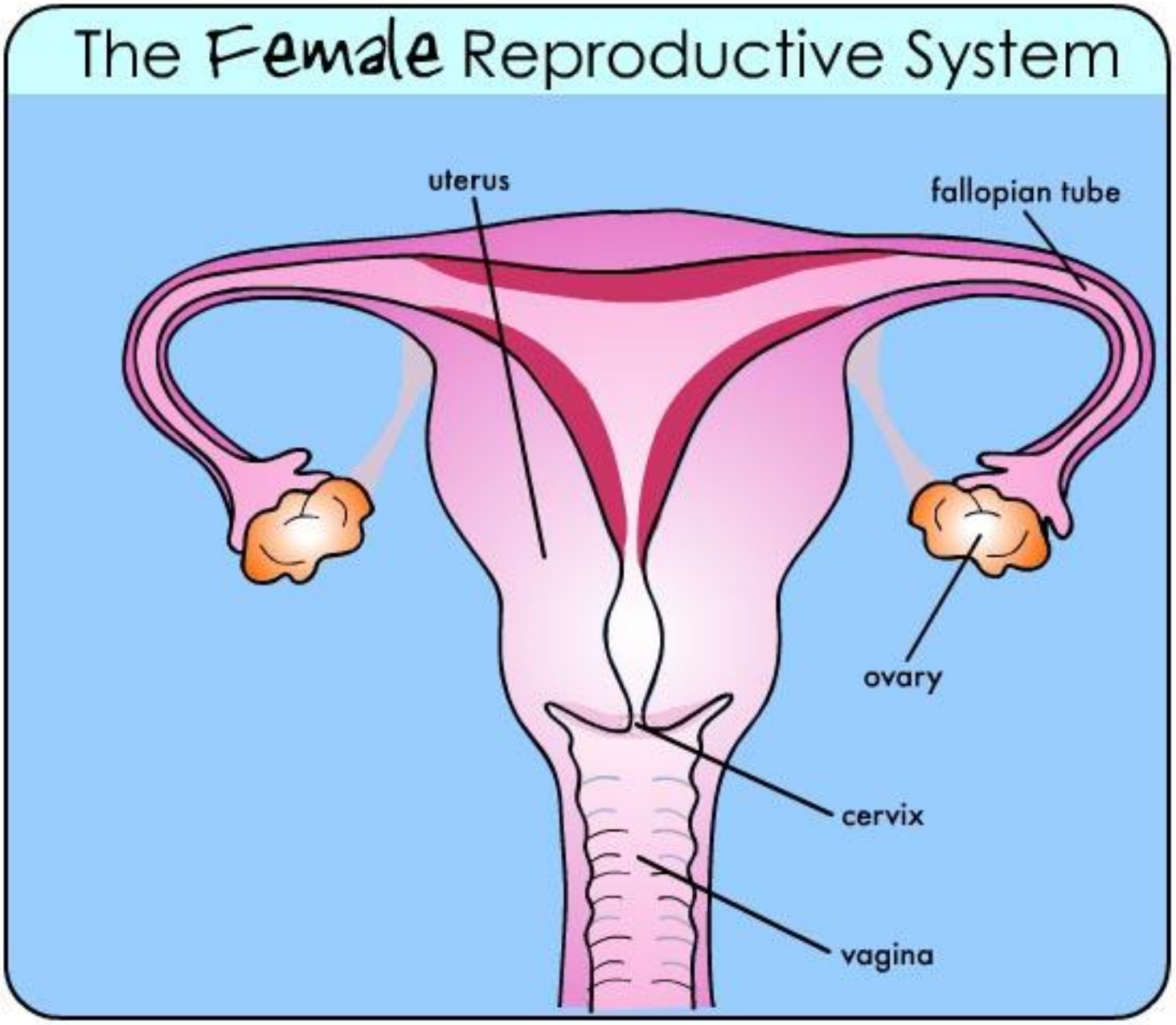
After Intercourse

After being released inside the vagina during ejaculation, sperm **swim towards the egg**.

The sperm swim up the vagina, through the cervix and uterus to reach the **Fallopian tubes**.

There, they hope to meet an egg to **fertilize** it.

Only **one sperm** can penetrate the egg.
All other sperm die off.


The Female Reproductive System
uterus
fallopian tube
ovary
cervix
vagina

Fertilization

The goal of sexual intercourse is **fertilization**.

During fertilization, a single sperm cell **joins with an ovum**.

The nuclei of both cells join together to create **one cell**.

This new cell is called a **zygote**.

Fertilization

zygote

After Fertilization

After fertilization, huge **changes in the zygote** begin.

The new zygote releases chemicals to **block all other sperm** from entering.

The zygote begins to travel down the fallopian tube towards the **uterus**.

On its way, it begins to **divide** and quickly forms a growing **mass of cells**.

After Fertilization

The Dividing Zygote

Implantation

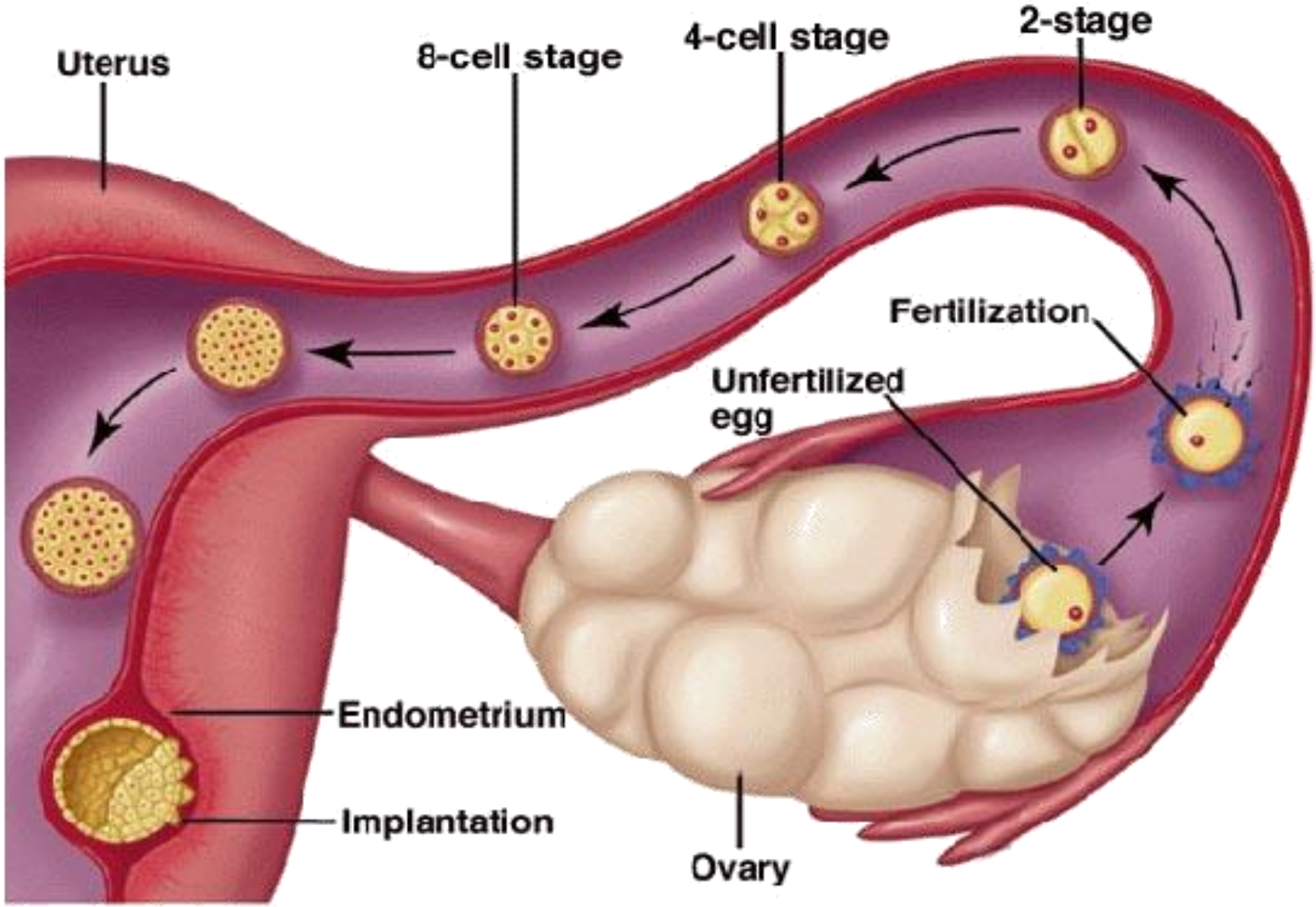
The journey to the uterus takes **4-7 days**.

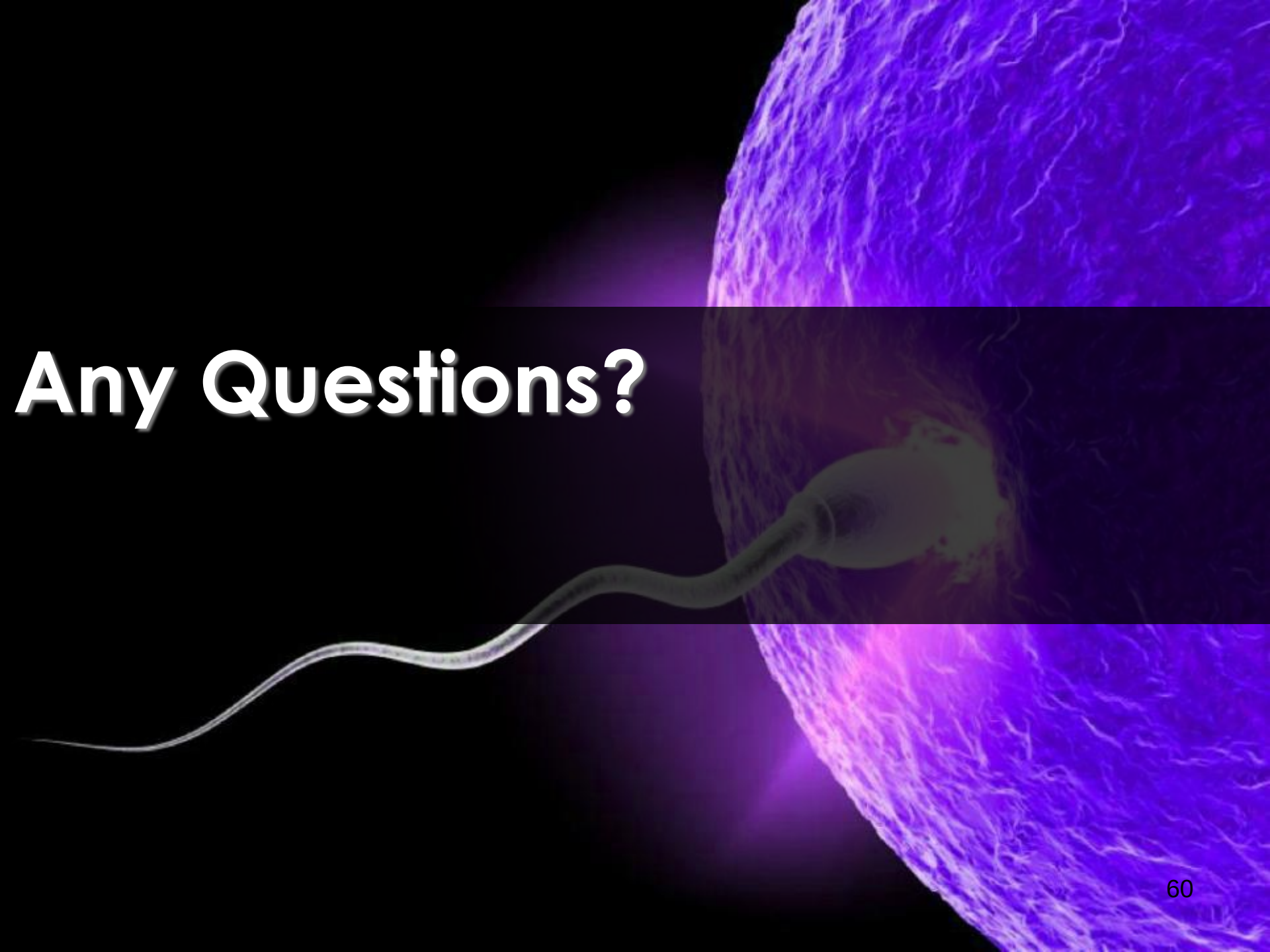
By that time, the zygote divides to become a **ball of cells** that is now called an **embryo**.

Once the embryo reaches the uterus, it **implants** itself.

There, it will receive **nourishment and grow**!

Implantation




Any Questions?

The Reproductive System

Part 5: Development and Birth

Review

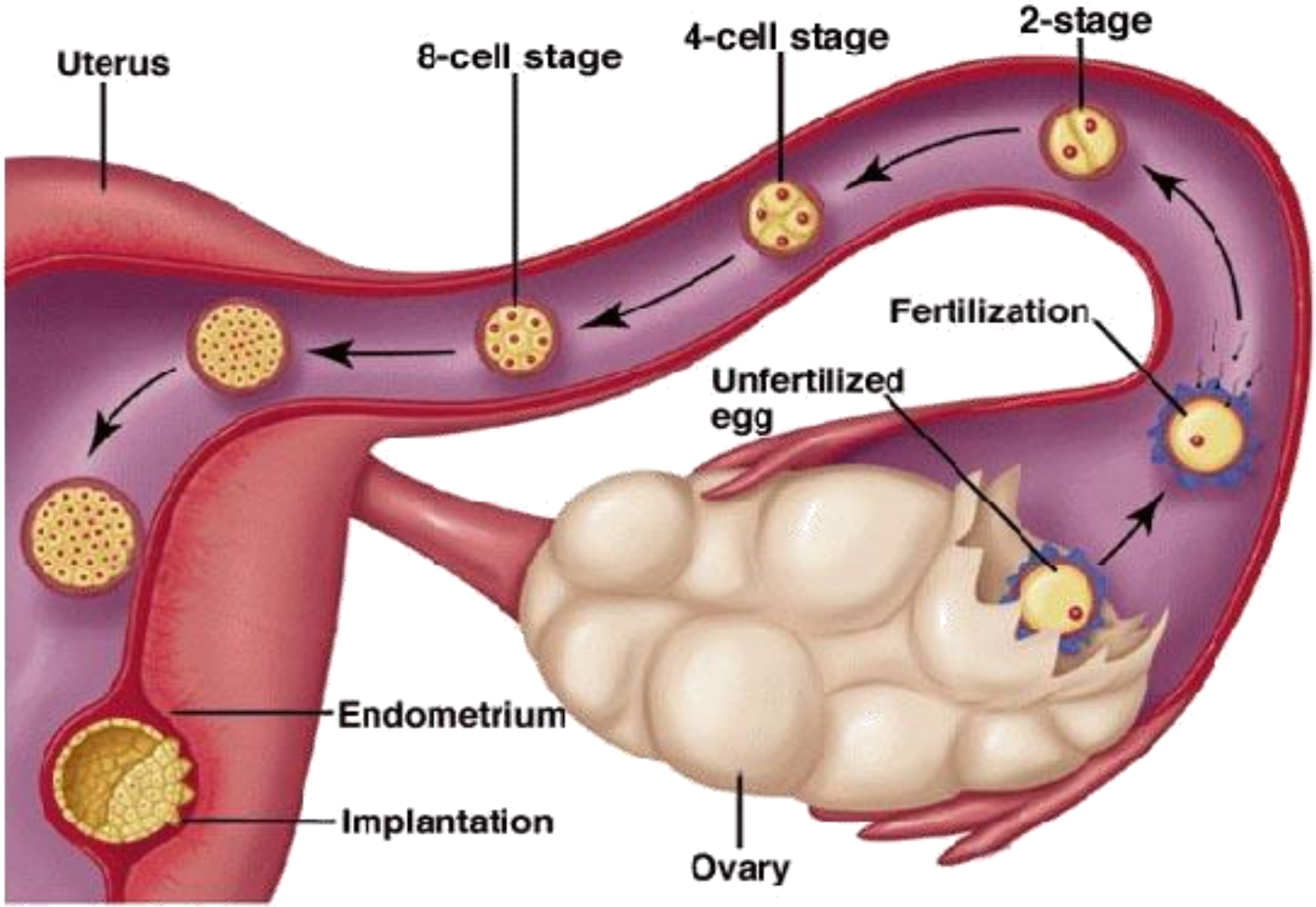
A sperm and egg fuse to form a **zygote**.

The zygote divides as it journeys to the **uterus**.

In 4-7 days the ball of cells is called an **embryo**.

When it reaches the uterus, the embryo **implants**.

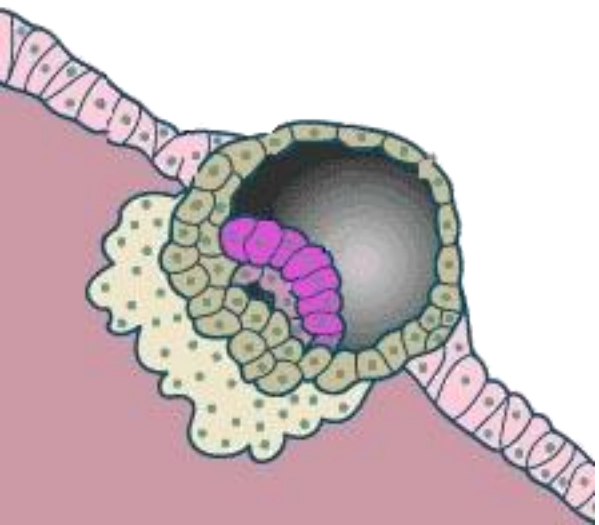
Review


Uterus
8-cell stage
4-cell stage
2-stage
Fertilization
Unfertilized egg
Endometrium
Implantation
Ovary

After Implantation

Soon after the embryo implants in the uterus wall, **new structures** form around it.

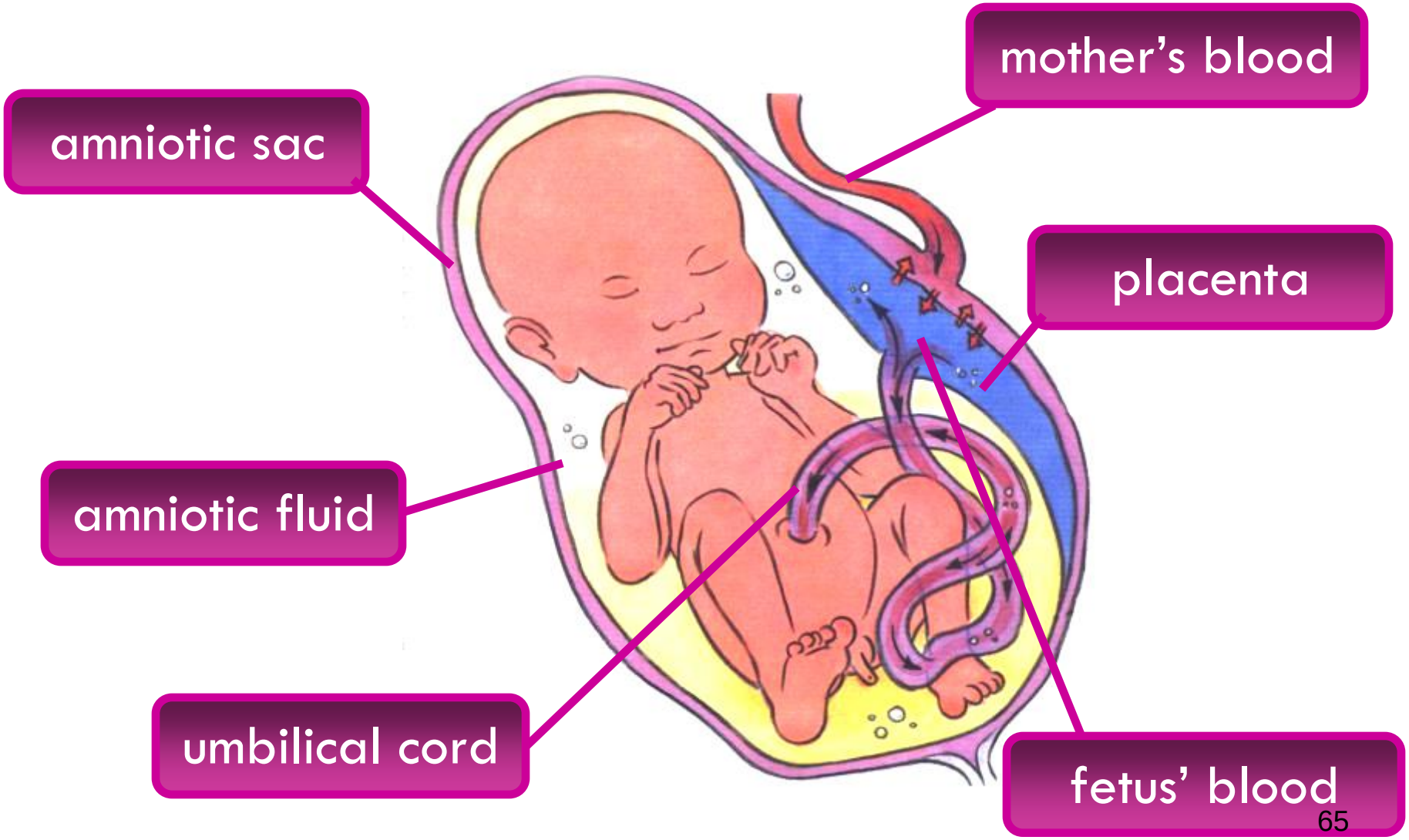
The structures are designed to **protect and nourish** the developing embryo as it grows.



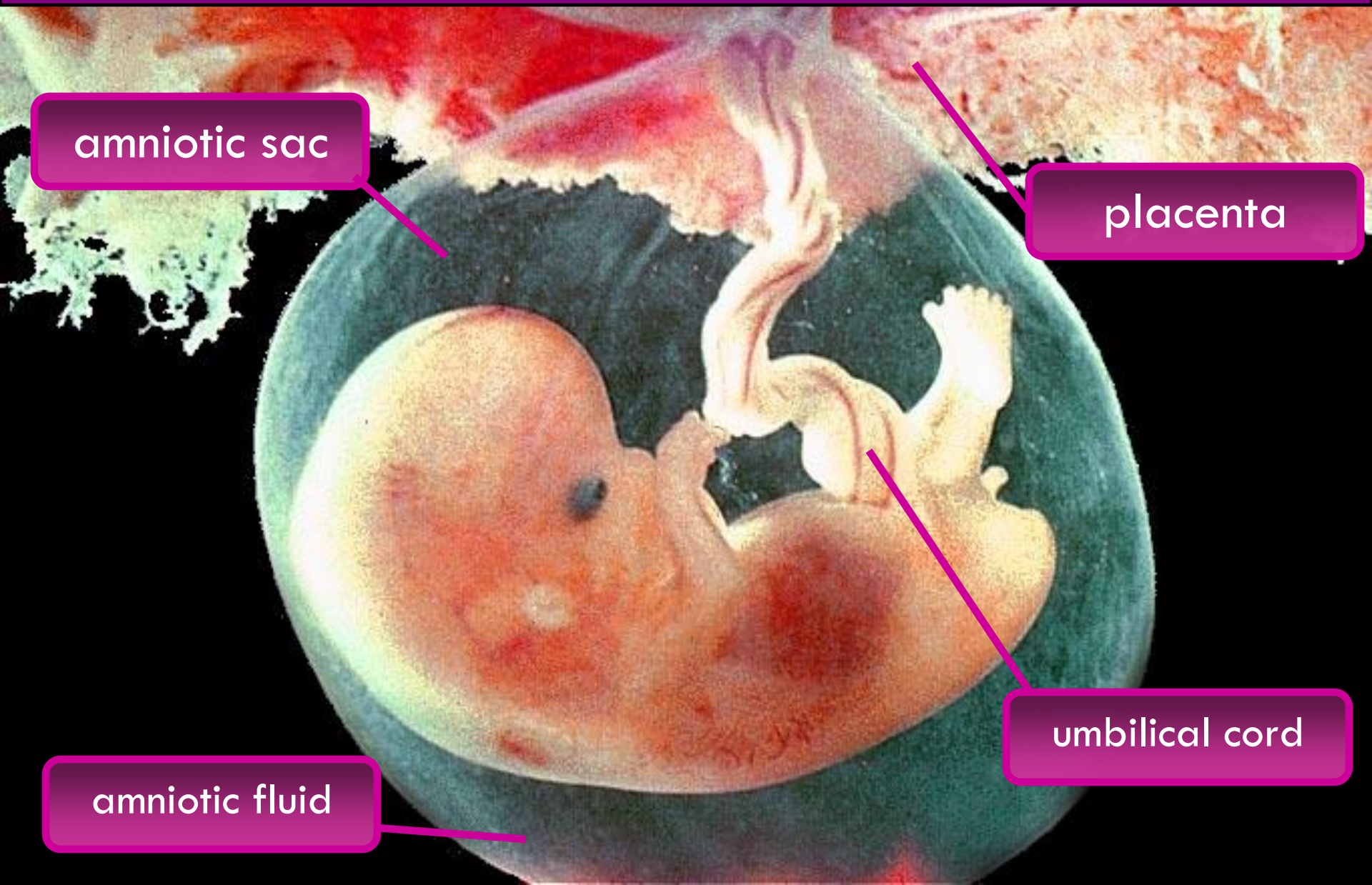
The structures include:

- amniotic sac
- placenta
- umbilical cord

Fetus in the Uterus



Fetus in the Uterus



Amniotic Sac

The **amniotic sac** is similar to a fluid-filled bag.

Amniotic fluid in the amniotic sac cushions and protects the developing fetus.

It acts like a giant **shock absorber**!

Placenta

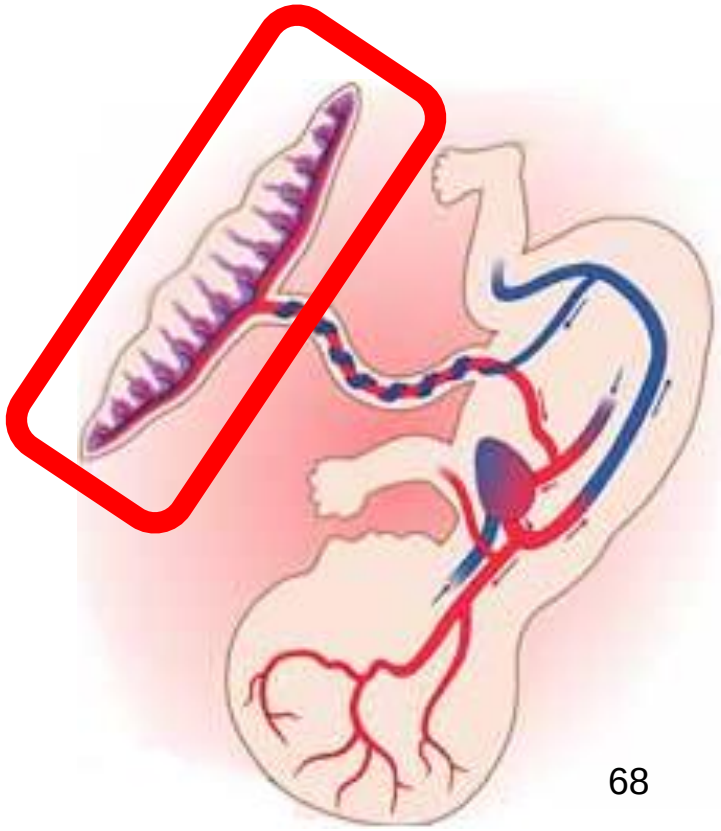
The **placenta** links the embryo to its mother.

It brings the fetal blood **next to** the mother's blood

NOTE: They **DO NOT** mix!

IN: food, water, O_2

OUT: wastes, CO_2



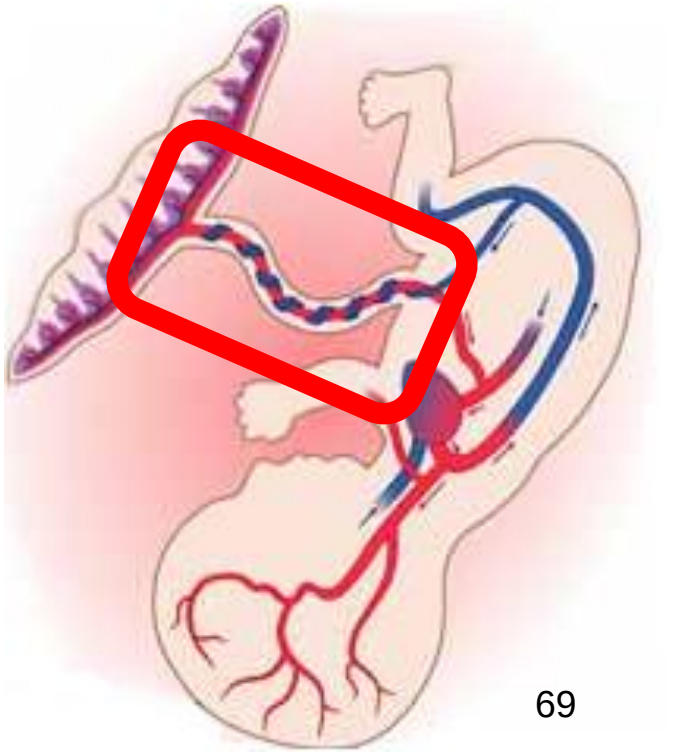
Placenta

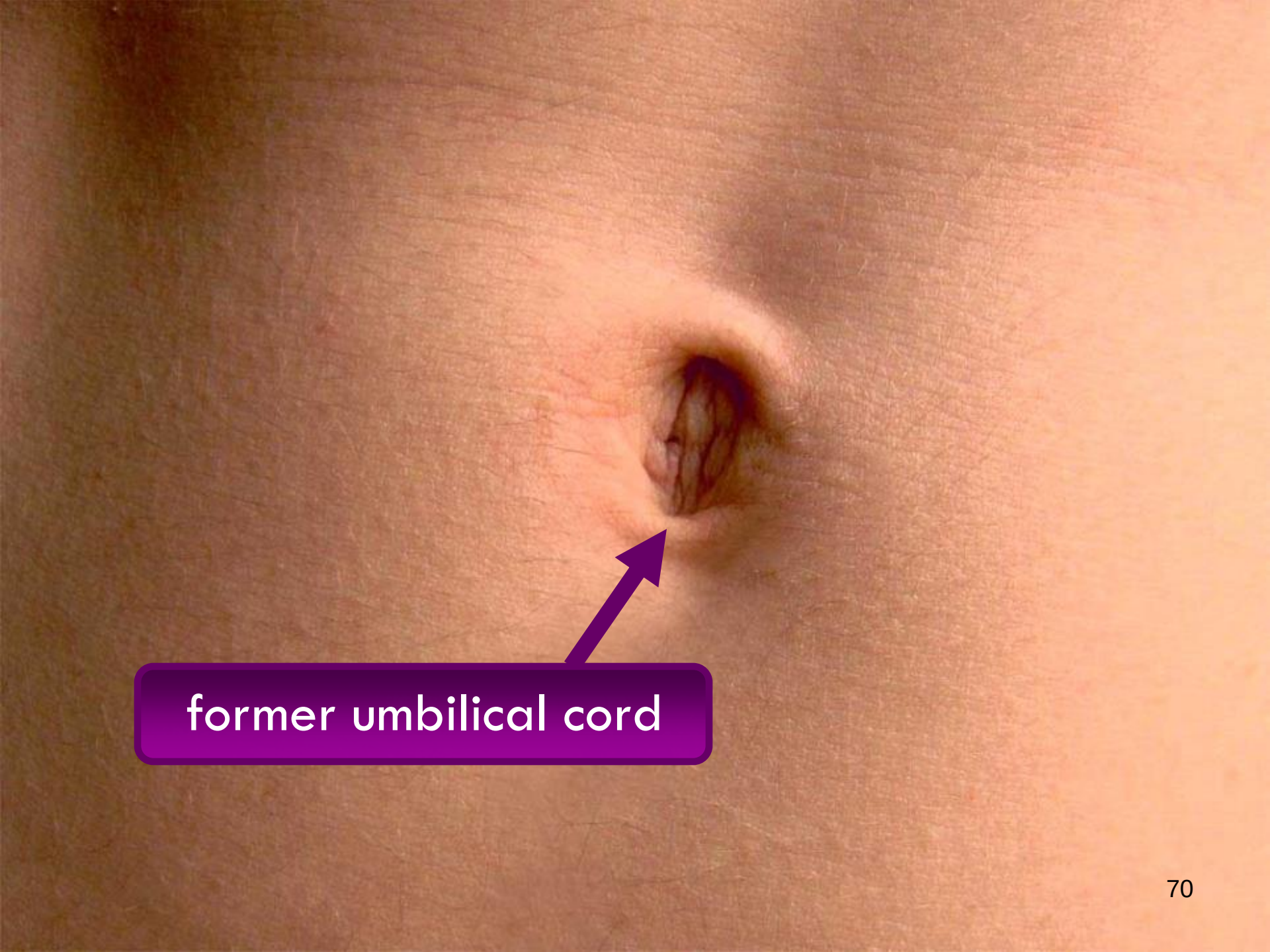
The **umbilical cord** connects the embryo to the placenta.

It is simply a tube that contains **blood vessels**

When a baby is born, the cord must be cut off.

The base of the cord forms your **belly button**.




former umbilical cord

Fetal Development

The ball of cells takes roughly
nine months to develop into a baby.

Pregnancy is usually divided up into
3-month sections – called **trimesters**.

Fetal Development

The ball of cells takes roughly
nine months to develop into a baby.

first trimester	second trimester	third trimester
cell division	organs formed	major growth
organs forming	brain growth	birth!

First Trimester

A small collection of cells early on

Heart and nerves form

Respiratory system forming

Not all organs have developed

1 month

First Trimester

Embryo is ½ inch long

Muscles are developing

Fingers, toes and teeth forming

Squinting, swallowing and tongue moving

2 months

First Trimester

Embryo called a fetus

All major organs have formed

Dreaming

Stretching, kicking and "womb-jumping"

3 months

Second Trimester

Fetus 6 inches long

Covered in soft hair called lanugo

Hair, eyelashes and fingerprints

Very active: moves 50 times per hour

4 months

Second Trimester

Fetus now 1 pound

Hears and recognizes mother's voice

Can open their eyes slightly

5 months

Second Trimester

Skin covered in waxy layer called vernix

Learning constantly

Smiling, crying, scratching, hiccupping

6 months

Third Trimester

Fetus now 2-4 lbs.

All major organs maturing

Fat is being created and deposited

Can survive if born, but will be premature

7 months

Third Trimester

Rapid growth:
gains ½ lb. per week

Organs fully mature,
except for lungs

Rapid brain growth

Start to turn
head downward

8 months

Third Trimester

Most bones hardened but skull still soft

Shedding hair and waxy *vernix*

Lungs mature: ready to be born!

9 months

Stages of Birth

After 9 months, the fetus is ready to be **born**.

Birth takes place in **3 stages**:

- labor
- delivery
- afterbirth

1. Labor

Strong **muscle contractions** of the uterus make the cervix enlarge

2. Delivery

The fetus **pushed out of the uterus** through the vagina. First breath with its own lungs.

3. Afterbirth

Final contractions push the **placenta** and other structures out of the uterus and vagina.

The Reproductive System

Special Topic: Twins!

Twins

Twins can be formed in a **3 main ways**.

There are 3 different types of twins:

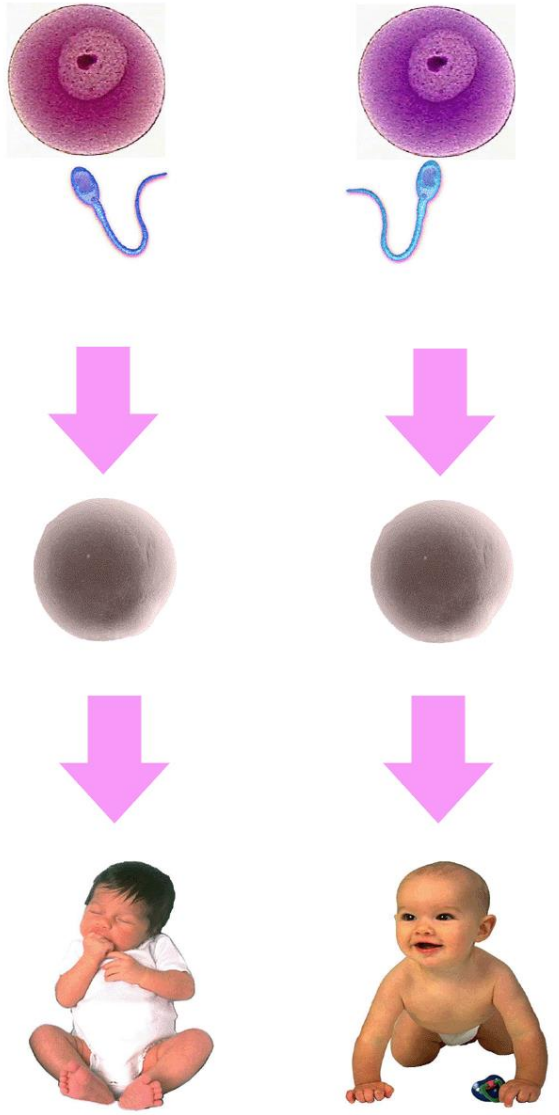
- fraternal
- identical
- conjoined

Fraternal Twins

Fraternal twins are formed when **two different ova** are fertilized by **two different sperm**.

Since the cells involved are different, so are the twins!

They can be girl-girl, boy-girl or boy-boy.

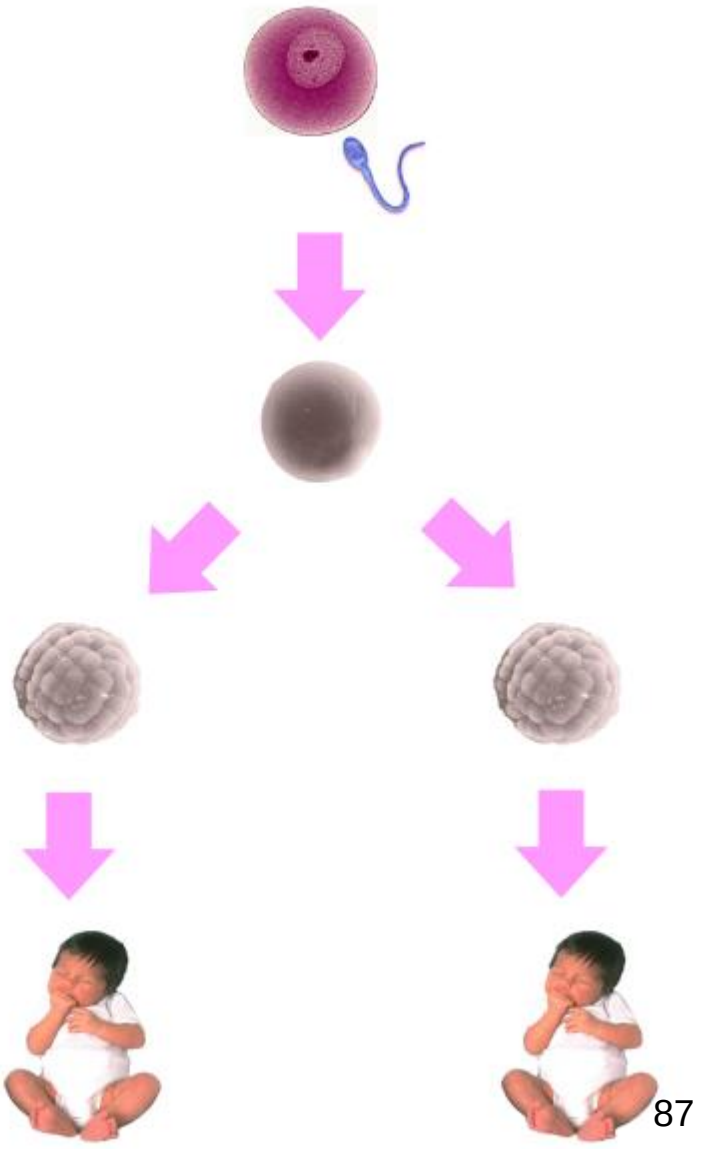


Identical Twins

Identical twins are formed when **1 ovum** is fertilized by **1 sperm**.

The dividing zygote then **splits in 2** and both cells develop into babies.

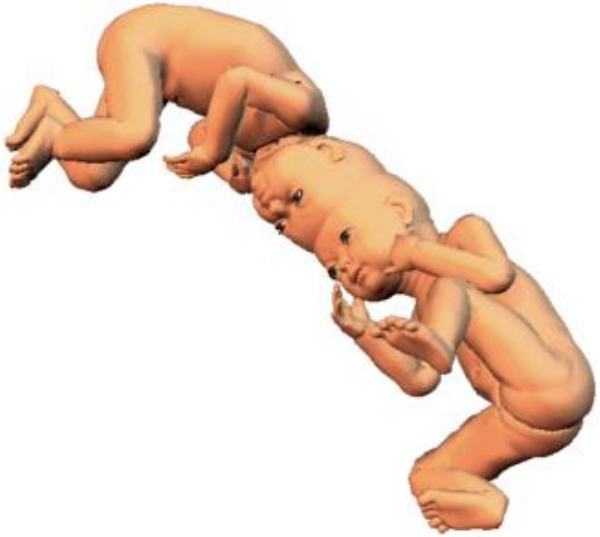
Since both babies came from the exact **same sperm and ovum**, they are identical!



Conjoined Twins

Conjoined twins (formerly called **Siamese twins**) form like identical twins, but the zygote **did not split** completely.

The fetuses develop on their own, but they are **still attached** at some location on their bodies.



The Original "Siamese Twins"

Eng and Chang Bunker

For a short Time.

SIAMESE TWIN

United Brothers.

The Ladies and Gentlemen of Leeds, and its Vicinity, are respectfully informed that the

UNITED BROTHERS

ARE NOW EXHIBITING AT

THE CONCERT ROOM

OF THE

COMMERCIAL BUILDINGS,

Where they will be happy to receive their Visits.

Those who wish to gratify their Curiosity in witnessing this wonderful Production of Nature, are requested to make an early Call, as their Stay here will be short.

Hours of Exhibition, Eleven to Four, and Six to Half-past Eight in the Evening.

ADMISSION, ONE SHILLING.

Historical Books, with full-length Portrait, Sixpence each.

CHANG and ENG, the two youths, were born in Siam, on the borders of China, of Chinese parents. They have passed their nineteenth year, are five feet two inches in height, well formed, in full health, and display all the faculties of the mind in their fullest extent. Since their arrival in England they have been visited by all the Royal Family and many thousand ladies and gentlemen of distinction, who universally have expressed their satisfaction of the exhibition.

HERNAMAN AND FERRING, PRINTERS, INTELLIGENCER-OFFICE, LEEDS.


Any Questions?